



University of Tasmania

Faculty of Health

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The dynamics of health information management in Australia: the emergence and shaping of a profession

By

Kerin Margaret Robinson, BHA, BAppSc (MRA), MHP

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To my wonderful husband, Nicholas, and amazing daughters, Danielle and Philippa,
and to the memory of the late Irene and Edward O'Neill Byrne.

Statement of authorship

This thesis contains no material which has been accepted for the award of any degree or diploma by the University or any other institution, except by way of background information and duly acknowledged in the thesis, and to the best of my knowledge and belief no material previously published or written by another person except where due acknowledgement is made in the text of the thesis, nor does the thesis contain any material that infringes copyright.

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The research associated with this thesis abides by the international and Australian codes on human and animal experimentation, the guidelines by the Australian Government's Office of the Gene Technology Regulator and the rulings of the Safety, Ethics and Institutional Biosafety Committees of the University.

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Abstract

This dissertation describes original research that explores, for the first time, the historiography and roles of Australia's Health Information Managers (HIMs). The ecology of health information management was examined to show how key societal and political influences have shaped the profession, and to identify the implications for HIMs of evolving organisational arrangements. In interrogating the profession's roles, a qualitative approach was used, incorporating face-to-face, in-depth interviews with an Australia-wide cohort of HIMs and ethnographic observation or in-depth interviews in three case studies.

Scaffolded by the Foucaultian centrality of the medical record to medicine and the modern hospital, the drivers and contestations that shape HIMs' work hinge upon: standardisation; scientific medicine; bureaucratisation; technologisation; the hegemony of healthcare managers; the forces of the risk society exemplified in healthcare resourcing, performance, and quality of care accountabilities; health consumers' interests; and a nascent commodification of health information.

The findings situate HIMs as a metaphorical keystone species in the health information ecology: they populate a critical interface between uncertainty and the indeterminacy of absence of information, and the clarity of knowledge and "truth". They struggle constantly to impose order. Drawing upon Durkheim and Mauss, this is seen to be effected through the HIMs' purifying and transforming the 'mess' of the raw data of the performance of healthcare into the elegance and sacredness of interpretable, mobile codes and facts. They constantly traverse boundaries, negotiate, and form alliances with human and non-human actors. They structure and legitimate bureaucratic relationships to facilitate health surveillance, and commodify patients and their diseases. Their infrastructuring and technologising work thusly translates, classifies and qualculates the messy and the unclassifiable into the workable and the portable.

The overarching problematic of the contemporary Australian health information management profession is three-fold. First, paradoxically and notwithstanding the centrality of their scientific work, the HIMs' ordering across the spectrum of information in healthcare is largely invisible. Second, technology proves a temperamental ally that demands constant updating. Third, the chasm between their dichotomous worlds of disorder and order is ever-widening, amid: increasing systemic dependence on their information production; intensifying environmental risk; multiplying standards; and increasing volumes of data. It is concluded that the profession has emerged as an organising device central to healthcare managerial, research, and medical interests. Occupying a trustworthy role, the HIMs' challenges lie in determining what is health information, governing its production systems, and (re-)constructing, reconciling, and disseminating critical informational outputs as the official facts of both patient and healthcare system.

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List of Abbreviations

ABF	Activity-based funding
ACHI	Australian Classification of Health Interventions
ACHS	Australian Council on Healthcare Standards (formerly Australian Council on Hospital Standards)
ACS	Australian Coding Standards
AHA	Australian Hospitals Association
AHN	Area Health Network (used as a generic descriptor)
AFMRL	Australian Federation of Medical Record Librarians
AR-DRG	Australian Refined Diagnosis Related Group
ATD	Admission – Transfer - Discharge (system)
CEO	Chief Executive Officer
CI	Clinical Indicator
CSNS	Casemix Sub-acute and Non-acute System (a pseudonym)
CSCW	Computer-supported Co-operative Work
CWAU	Casemix Weighted Activity Unit (a pseudonym; used as a generic descriptor). Similar to WIES, below.
DoH	Department of Health (used as a generic descriptor)
DRG	Diagnosis Related Group
DMR	Digitised (or digital [scanned]) medical record
EBM	Evidence-based medicine
EBH	Evidence-based health
ED	Emergency Department
EHR	Electronic Health Record
ESRS	(State-wide) Elective Surgery Reporting System (a pseudonym)
HFRS	Health Facility Reporting System (a pseudonym)
HIM	Health Information Manager
HIS	Health Information Service (in a hospital or other healthcare facility)
ICD	<i>International Classification of Diseases</i>
ICD-10-AM	<i>International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification</i>
ICT	Information and Communication Technology

IT	Information Technology
ITSU	(A state Department of Health's) IT Services Unit (a pseudonym)
KPI	Key Performance Indicator
LOS	Length of stay
MRI	Magnetic Resonance Imaging
MRL	Medical Record Librarian
NCI	The National Classification Institute (a pseudonym)
NPDS	Non-Admitted Patient Data System (a pseudonym)
NUM	Nurse Unit Manager
PAS	Patient Administration System
PDx	Principal Diagnosis
PMI	Patient Master Index
SCOT	Social Construction of Technology
SICC	State-wide ICD Coding Committee (a pseudonym)
SMHS	State-wide Mental Health System (a pseudonym)
SIMD	State-wide Inpatient Morbidity Database (a pseudonym)
SNDO	<i>Standard Nomenclature of Diseases and Operations</i>
SNOMED-CT	<i>Systematized Nomenclature of Medicine (Clinical Terms)</i> The Australian version is SNOMED-CT-AU
UR	Unit Record
VMO	Visiting Medical Officer
WHO	World Health Organization
WIES	Weighted Inlier-Equivalent Separation

Glossary of Terms

Abstraction (1)

The processes by which specific data are extracted from the medical record and other sources for 'clinical and administrative decision making' (Abdelhak, Grostick and Hanken 2012, p.693). It is used in extracting data for casemix, financial, audit, and multiple quality review functions.

Abstraction (2)

In the context of health classification, abstraction is defined by Australian Coding Standard 0010 as the HIM-Coder's review of the medical record (Australian Consortium for Classification Development 2015, Australian Coding Standards). The purpose is to verify that the final diagnoses, as documented by the clinicians, are supported by the content of the medical record for the purpose of classification. Abstraction also involves the HIM-Coders' clarification of discrepancies involving test and investigation results, and classificatory decisions regarding all diagnostic results where they '... add specificity to already documented conditions that meet the criteria for a principal ... or additional diagnosis' (p.10).

Data (healthcare)

The raw, unprocessed facts, figures, ideas and observations recorded about a patient at the point-of-care and at other critical points of the patient journey. *Administrative data* are contained in the patient identification, socio-demographic and financial details, and in supporting documentation (e.g. consent-to-treatment). *Clinical data* constitute details recorded by doctors, nurses, and allied health professionals; they include notes of history, examination, plans, progress, treatments, tests, investigations, and outcomes.

Hospitalisation, or episode of care

An episode of hospital care commencing at the patient's admission and ending at discharge; alternatively called an *admission* or a *separation*.

Separation

The (formally documented) end point of a patient's hospitalisation.

SNOMED-CT-AU

The Australian adaptation of the *Systematized Nomenclature of Medicine (Clinical Terms)* which is a comprehensive clinical reference terminology established from the American College of Pathologists' SNOMED RT® (Reference Terminology) and the United Kingdom National Health Service's *Clinical Terms* (the Read Codes). The SNOMED-CT-AU enables standardised coding of concepts and descriptions of healthcare, ultimately for use with the electronic health record.

Unit Record (UR)

Conceptually a unitary body, the UR is a paper, digital or electronic record, or a hybrid version. It may be physically and spatially contained within one folder or file, or dispersed across multiple media, databases, and sites. It contains all clinical and related information about a patient, and is identified (and its components are linked) by a UR number that is unique to that patient.

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Chapter 1

Introducing the world of health information management

Introduction

This dissertation examines the historiography and roles of Health Information Managers (HIMs) within the ecology of Australian health information management. Drawing upon Nardi and O'Day's (1999) approach, the concept of ecology is adapted from the biological model and used metaphorically to capture the milieu and culture of the health information management profession in its healthcare system environment.

The work of this profession has not hitherto been researched. This is a pioneering study undertaken to chronicle the profession's development, establish our knowledge and understandings of its roles and discourses in Australia, and to frame its work in innovative ways to account for developments that pushed 20th century health information management work well beyond its original boundaries. For the profession to perform its increasingly complex functions in a rapidly changing healthcare environment, an understanding of its knowledge and work is vital. The research investigates the meanings and the practice of health information management with the purpose of stimulating our thinking about HIMs' professional agendas in Australia, so that 21st century developments are converted into strategic choices for the HIM workforce.

Major drivers

Foucault (1973) identifies the file, and its categorisations and classifications, as underpinning modern medicine and the modern hospital. By extrapolation, they gird health information management. In exploring the essence of what it is to be an HIM in the Australian context, this study reveals that several key societal and political influences have moulded, and continue to shape, the profession's roles and discourses. It will be seen that these interrelate and are not mutually exclusive. They are:

- 'Scientific medicine' which reflects the influences on medicine, in the past century and a half, of the medical record and diverse factors such as technologies, laboratory-based sciences, evidence-based medicine and evidence-based health.
 - Standardisation applied in healthcare, hospitals and, also, health data and information.
 - The increasing hegemony of non-medical healthcare managers, and associated managerial and resource-related accountabilities.
-

- Bureaucratisation that has emerged in healthcare since the 1960s, driven partly by pressures for greater efficiency.
- Technologisation, and the constant change in health information management produced by the rising prominence of physical and electronic artifacts, processes and activities, and skills and knowledge (such as defined in Bijker, Hughes and Pinch's [1987] components of technology).
- The forces of the risk society exemplified in the rationalisation (and above-mentioned managerialisation) of healthcare including performance, resourcing, and quality of care accountabilities, and the effects of the fast-paced information society.
- Consumer interests reflected in health information-related laws according patients the right to access their medical records and, separately, mandating protection of their information privacy.
- A nascent commodification of health information from the late 20th century as patients' diseases and operations are translated by HIMs into codes and, thence, to financial currency.

These influences are explicated in the following chapter. It will be shown that they have propelled HIMs from a paper-based, custodial and classificatory hospital environment into their fast-paced, 21st century electronic information-centric world. Ironically, the HIMs remain largely unseen.

Methods employed

In interrogating the profession's roles, a qualitative approach was employed; this incorporated face-to-face, in-depth interviews with an Australia-wide cohort of HIMs in different areas of the healthcare system. Additionally, three case studies were undertaken using ethnographic observation or in-depth interviews. The case studies sought to explore the work of HIMs in their everyday employment settings: in a capital city area health network; implementing a region-wide health information system; and enacting collective decision-making to inform state-wide health classificatory policy and practice.

Boundaries of the research

The boundaries of the research circumscribe this discrete, identifiable cohort of HIMs. This small profession has had a formal presence in Australia for almost 70 years (Ell 1984; Watson 2013). It

has evolved, more rapidly in the last three decades, from confluences of the aforementioned societal and political influences.

A central organising device

The findings will be seen to demonstrate that the health information management profession has emerged as an organising device central to healthcare managerial, research, and medical interests.

The study accounts for the profession's domains and its intersections with what Strauss (1978) describes as other, immediately continuous, social worlds. It is also contextualised in the physical and electronic world of health information including the primary repository of health data, the medical record¹ and its derivative datasets, which collectively are the *raison d'être* of the profession. Notwithstanding this presence, and as Gardner and Barraclough (2002) observe, 'although health information ... provides the data upon which health funding such as casemix is based, it has received very little acknowledgement or detailed treatment outside the profession's own publications' (p.5). Against an historical and contemporary backdrop of change, this dissertation evokes a hologram of HIMs' engagements in different roles and sectors of the Australian healthcare industry. An underlying premise of this research is that health information permeates and supports care delivery from the point-of-care of the individual patient², through to and throughout the wider healthcare system at population level. Its management, therefore, is central to the healthcare system.

The foci of this chapter

This chapter introduces medical record librarianship (the forerunner of contemporary health information management). It proceeds to explore the centrality of the medical record to medicine and the modern hospital, and as a scientific device, and introduces the meta-principle of this dissertation.

¹ Throughout this dissertation the term 'medical record' is used, for brevity, instead of 'health and/or medical record'. In so doing, I am respectful of the important clinical, public health and sociological differences between 'health' and 'medical' and emphasise that there is no intention to privilege the biomedical over the social.

² For brevity, I use the term *patient* to account for *patients* and *clients* of healthcare services and facilities.

The creation of medical record librarianship

Medical record librarianship, the antecedent of contemporary health information management, evolved almost a century ago in the United States of America (USA) and, following the American model, in Australia in the mid-20th century. This development was reflective and constitutive of the symbiotic relationship between medicine and the medical record which has endured from the earliest times of primitive recording to the contemporary sophistication of the electronic health record (EHR)³: 'The history of medical records runs parallel with the history of medicine. Records ... seem to have been made from earliest antiquity' (Huffman 1972, p.1). Reiser (2000) situates the contemporary medical record as a key 'data organizing technology' (p.31) with temporal significance that embodies facts as recorded, 'observed events' (p.31). Indeed, as Martin and Sinsky (2016) assert, '[f]ew health-care traditions are as universal as the medical record' (p.1).

'Noso-politics' and the medical record

In framing HIMs' work across the spectrum of individual medicine and population health, we now cast back to Foucault's (1973) dual-construct of late 18th century medicine. On one hand, this comprised a biomedical focus on the individual and, on the other, a 'bio-politics' of the population, the latter referencing the state's ability to regulate, collectively surveil and manage the (bodies of the members of its) population through laws and technologies (Foucault 1973, 1980; Gutting 2005; Turner 1987). Foucault (1973) identifies as 'nosology', or 'noso-politics', the domination of medical theory and practice by 'the classificatory rule' (p.4). This complex, multi-linear phenomenon is associated with the reason, standardisation and scientific knowledge characteristic of the late 18th century. Nosology forms the basis of diagnosis in the 21st century, according to Armstrong (2011), and is seen in the *International Classification of Diseases* (ICD) used by HIMs. Inherently classificatory, nosology is deeply embedded in health information management practice. For the purposes of the current study, I interpret it in two contexts. Firstly, it includes the perceptions and understandings of patients' illnesses that clinicians inscribe in the medical record when practising medicine of the individual. This involves what Foucault (1979) describes as the clinical 'gaze'

³ Useful accounts of these developments can be found in Sydenham (1696), Jones (1923), King (1971), Singer and Underwood (1962), Huffman (1981), Reiser (1991), Wilkins (1992), Faria (1994), Porter (2001), and Churchill (2005).

(p.190)⁴. Secondly, in the arena of HIMs' work, nosology concerns the study and knowledge of health classification. As Foucault (1973) observes, '[i]n order to know the truth of the pathological fact, the doctor must abstract the patient' (p.6), elicit the clinical history, distinguish relevant symptoms, and establish a diagnosis. Following the patient's discharge, the HIMs separately undertake abstraction of his or her details from the medical record, extrapolating the doctors' written perceptions and diagnoses in order to re-work and classify the patient into other forms including codes, data, statistics, epidemiological facts, and financial units.

In representing the metaphorical capture and perpetual observation of the body, Foucault's (1979) regime of surveillance incorporates patient documentation (Dreyfus and Rabinow 1983; Armstrong 2011). Adopting Bentham's panopticon as the model, Foucault's surveillance enables what Paternek (1987) describes as '[c]onstant observation, hierarchically organized, [that] produces the "knowledge" needed to penetrate, divide, and classify each individual subject ... documented as a "case" to be reconstituted through comparison with others' (p.108; Foucault 1979; Turner 1987; Crossley 1993). Foucault's panopticon can be seen as metaphor for the medical record and its databases that surveil the patient. When interpreted from a health information management perspective, the codes and other forms of data created from 'cases' treated in the medicine of the individual ultimately are recast, anonymised and aggregated by HIMs; these enable and contribute to the systematisation, analysis, and comparison of population-level morbidity and mortality information.

The scientific significance of files

Latour (1986) endorses Foucault's focus on the centrality of files and institutions such as hospitals wherein 'these inscriptions end up being so essential' (p.15). He commends Foucault's concept of the panopticon as 'an invisible power that sees everything about everyone' (p.15), thereby allowing the medical disciplines 'to emerge as full-fledged sciences from their carefully kept [hospital] files' (p.15). For Latour (1986), this is about science: the 'sure path of science' is, 'inevitably, in the construction of well-kept files in institutions that want to mobilize a larger number of resources on

⁴ Based upon clinical-pathological knowledge, 'the gaze' includes examination, diagnosis and therapy that, when documented, provide a clinical description of the patient and his or her disease(s) (Foucault 1980).

a larger scale' (p.15). In the context of health information management, the medical record in its various formats and databases thus comprises critically important 'documents' that are central to medicine, scientific medicine, research, and hospitals. As a 'structured nosological field' (Foucault 1973, p.59) the modern hospital was, and remains, underpinned by the medical record, its categorisations and classifications. A locus for 'the correlation of knowledge' (Foucault 1973, p.186), the hospital, together with the contemporaneously evolving public health systems and their behind-the-scenes documentation, thus collectively epitomised the new era of scientific medicine.

Disciplinary writing

As conceptualised by Foucault (1979), 'disciplinary writing' (p.190) included classification and the categorisation, calculation, reporting and comparison of hospital, state and national morbidity and mortality statistics, which overlaid the therapeutic space (Foucault 2004). Given the nosological underpinnings of the organisation of medicine, healthcare and the hospital, it is not surprising that the labour of managing classificatory documentation and systems became more prominent over time, culminating in medical record librarianship.

Occupation or profession

The health information management profession began as what Abbott (1995) describes as a form of 'quasi-occupation' (p.874) established to undertake "librarianship" work with hospital medical records. This work complexified over time and the occupation morphed into the 'profession' (as defined by Abbott 1995, p.878) of health information management. The Australian literature refers to health information management (or its antecedents, these being medical record librarianship and medical record administration) as an allied health profession (Dewdney 1972; Palmer and Short 1989). On occasion in the past, health information management together with other disciplines, including physiotherapy and speech pathology, have been ascribed the more depreciatory descriptor of 'paramedical' professions as, according to Palmer and Short (1989), they were traditionally female-dominated and seen as 'the "handmaidens" to medicine' (p.147). Gardner and McCoppin (1989a) observe a trend in Australia since the 1970s for these health 'paraprofessions' (p.305) to refer to themselves as professions and their members as professionals, consistent with

their efforts to narrow the gap between themselves and 'the dominant profession' (p.305) of medicine.

In self-describing as a 'profession', the occupation of health information management in Australia is seen to adopt Bates and Linder-Pelz's (1987) 'consensus' view of professions as 'special occupations which have certain rules of behaviour' (p.179). It will become apparent that the limited power that they hold is situational and, typical of many professions, does not extend to public policy; its members do, however, serve the objectives of institutions of what Friedson (1994) describes as the 'state' and 'corporate capital' (p.33; 1986). The health information management profession identifies and differentiates itself through its credentials and infrastructure (including discipline-specific knowledge and skills): a national association and state branches; profession-entry (graduate), intermediate- and advanced-level competency standards; a university degree in the discipline that is accredited by the peak professional body subject to compliance with the profession-entry competency standards; professional practice ethical guidelines; workplace supervision of the significantly lesser-qualified occupation of Certificate (Clinical) Coder; a peer-reviewed professional journal; and a professional practice journal (Health Information Management Association of Australia 2013, 2015).

The profession's title

The Australian profession's evolution is reflected terminologically in the change of title from the custodially-focused Medical Record Librarian to Medical Record Administrator in the 1970s, and Health Information Manager in the 1990s (Ell 1984; Watson 2013). I posit here that these changes reflected the confluence of powerful forces which can be viewed through the frame of Alford's (1975) structural interest group perspective which references the influences on health politics and policy of three core groups. Analyses of this approach within the Australian context, by Duckett (1984) and Lin and Duckett (1997), reveal shifting tensions and convergences between the structural interests in influencing health policy directions. The professional monopolists (medical and other health professions) interest group seeks 'a controlling influence in health policy' (Gardner and Barraclough 2008, p.22). The corporate rationalisers (health administrators, health insurance funds and bureaucrats including from government health departments) challenge the professional

monopolists by promoting 'rational planning and efficiency' (p.22) and 'technocratic' (Duckett 1984, p.959) solutions. This is partly reflective of neo- or market liberalism, known in Australia as economic rationalism or managerialism and subsequently termed 'new public sector management' (Gardner and Barraclough 2008, p.22; Nevile 1997; Swerissen and Duckett 1997; Galligan and Roberts 2007). Economic rationalism reflects principles of market competition that facilitate health system reform and efficiency (Orchard 1998). The third group, the equal health advocates (community- and consumer-based interests), represents repressed interests and argues for accountability and equity (Gardner 1989; Gardner and Barraclough 2008).

Since the 1970s, these structural interests have influenced hospital accreditation, quality assurance, health information privacy and access rights, and the activity-based funding (ABF) models whose functioning is contingent upon HIMs' expert classificatory and analytical work (Palmer and Short 1989; Lapsley 2000; Banks 2004). Other health sector reforms have also had repercussions for HIMs, including a late 20th century health services management 'revolution' (Braithwaite 1993, p.417) seen in changes in hospital organisational structure, management, and financing, and the increasing presence of quality management. We are reminded also, by Swerissen and Duckett (1997), that private health insurance reforms in 1995 repositioned the funds in a negotiative relationship with hospital and medical providers: a function of the funds' purchaser role was 'to hold providers accountable for quality, efficacy and cost of care, hopefully supplementing the accountability to the patient' (p.37), whilst offsetting influences of the medical structural interests. The empirical evidence will show that the work of 21st century HIMs in the private hospital and health insurance sectors is pivotal to maintaining this accountability.

The contemporary Health Information Manager

A review of the English language health information management textbooks of the past half-century⁵ reveals that health information management is consistently identified as a critical component of the healthcare system. A persistent sense of urgency surrounds HIMs' changing

⁵ Huffman (1963, 1972, 1981, 1985, 1990, 1994); Benjamin (1977); Waters and Murphy (1979, 1983); Murphy-Muth (1987); Skurka (1994, 2003); Abdelhak, Grostick, Hanken and Jacobs (1996, 2001, 2007); Mattingly (1997); Lewis and Mitchell (1998); Murphy, Hanken and Waters (1999); Johns (2002a, 2002b); Amatayakul (2004); LaTour and Eichenwald (2006, 2010); McWay (2008, 2014); Abdelhak, Grostick and Hanken (2012, 2014, 2016); Brodnik (2012).

roles, adaptation to technologisation, and ongoing professional development, role transition and re-positioning, e.g:

[i]n today's fast-changing health care system, HIM professionals must lead the efforts in changing to an electronic health record and thus must adapt faster; expand their scope and domains of practice; use data, information and technology in a new way; and assess their performance. HIM professionals must update their knowledge constantly and approach their expanded roles and functions with a new mindset (Abdelhak, Grostick and Hanken 2012, p.xi).

Today's HIMs specialise in health data and their enabling and supporting systems throughout the healthcare system. Witnessing care from distance, they translate and document what Timmermans (2013) describes as 'the collective costs and benefits of biomedicine' (p.3). The Australian HIM:

... plans, develops, implements, evaluates and manages health information systems including clinical and administrative data, and healthcare records in health care facilities and other types of organisations ... analysing processes, healthcare records, information management, health administration, quality improvement processes, clinical classification and human resource management to provide services that meet the medical, legal, ethical, administrative and reporting requirements of the healthcare delivery system (Health Information Management Association of Australia 2013).

The shifting role

The American health information management literature refers to 'traditional' and 'emerging' practice roles and environments whereas the participants in this Australian research used the term 'traditional role'. In the USA, Johns (2002b) concludes that within the information engineering domain, HIMs focus more on operational and clinical data for user information needs than on technical functions. She foregrounds their information analysis and local policy development roles, featuring the HIM as intermediary or broker of information services to multiple organisational and individual clients. The literature reveals a call by contemporary American HIMs' leaders for definition of new professional roles in the adoption and governance of technologies, cost efficiencies, system interoperability, health data management, and information privacy and security (American Health Information Management Association 2003; Zeng, Reynolds and Sharp 2009; Calhoun, Rudman and Watzlaf 2012).

Theoretical and methodological contexts

The discipline of health information management in Australia, commensurate with its size, has a growing theoretical literature and an empirically-focused professional practice literature upon which I draw to exemplify aspects of HIMs' work. This study sits at the crossroads of health and

medicine, and the profession's own theories and practices of health information science and classification. In situating health information management within the wider scheme, the research draws upon medical history, computer-supported co-operative work (CSCW)⁶, health informatics⁷, and social studies of science and technology. Health information and the HIMs' work are positioned amidst what Hughes (1987) refers to as the inherent complexities of science and technology. The research is informed by a range of theoretical approaches that offer useful explanatory frameworks for the HIMs' work. These have enabled me to contextualise my findings within a broad theoretical perspective that allows me to achieve a global, or catholic, view of the challenges faced by HIMs in a rapidly-changing healthcare environment, and to identify and articulate the voice of health information management.

The meta-principle

It will be seen as this dissertation progresses that the Australian HIMs' transforming, classificatory and technologising work, in an environment of risk and change, brings life to the medical record. Their expert knowledge, and access to the embodied medical record and its data, give them inherent power. They engage intensively in translation work that, to borrow from Durkheim (1995), converts the profane to the sacred (Durkheim and Mauss 1963). This notion is also consonant with HIMs' other ordering work, and brings us to consider Durkheim's theory of classification, and Douglas' response to disorder which, collectively, constitute a key theoretical foundation of this dissertation.

Durkheim's classification

Early theoretical developments in classification originated in anthropology, wherefrom Durkheim and Mauss (1963) classified societies into tribes, clans and families (Turner 1991). The Durkheimian (1995) dyadic representation of sacred and profane is based on the notion of the religious

⁶ Technological change requires co-ordinated workplace and organisational adaptation. Facilitated by CSCW, this involves distributed, across-function and –organisational boundary functions (Schmidt and Bannon 1992; Turner et al. 2006). Its background-ness renders the work and workers vulnerable to oversight (Bowker, Timmermans and Star 1995; Muller 1999).

⁷ Health informatics is 'the science that deals with health information, its structure, acquisition, and use' (Stead 1999, p.88). In managing medical records and systems, HIMs engage constantly in informatics work: health information management and health informatics are so inextricably interwoven that they are not differentiated in this dissertation.

separation of the sacred, which constitutes actions and objects that transcend daily life, and the profane which is characterised by the mundane and problematic. This dichotomous relationship represents what Armstrong (2011) describes as the 'basis of all subsequent classifications' (p.802). Schmaus (1998) interprets Durkheim's classificatory concepts not as categories, *per se*, but as *représentations* essential in all societies for 'the kind of thinking that social life ... requires' (p.187). These represent, in diverse ways, 'the categories of space, time, and class' (p.180). In critiquing Durkheim's approach to objectivity, Lukes (1982) reminds us that social facts also have intersubjective meaning.

Synergistically, Douglas' (1966) response to disorder, through systematic classification and the establishment of ordered categories of the body, will also be seen to frame the HIMs' discovery and mobilisation of truth from indeterminacy.

Douglas' theory on pollution, risk, and disorder

Douglas' (1966) theory on pollution, risk, and disorder is significant in the context of this dissertation and its assertion that HIMs operate in a risky and uncertain environment to bring order from disorder. Douglas conceptualises a relationship between pollution beliefs and risk, her central theme being the human response to disorder; this may include risk, uncertainty and contradiction (Turner 1991).

Douglas' response to disorder is effected via systematic classification and the establishment of ordered, explanatory, restorative categories of the body described by Thompson (1998) as a 'metaphor of the social system' (p.100). She (Douglas) follows Durkheim and Mauss' (1963) interpretation of the body as 'the most ubiquitous, natural and unreflectively available source of allegories of order and disorder' (p.100). In mediating Durkheim's theory, Douglas presents us with a useful frame for interpreting HIMs' work in restoring informational order to the messy disorder of the human body and its diseases reflected in its documented diagnoses and treatments.

We will also see that, creating order from disorder, the HIMs purify health data at all levels of the healthcare system in order to transfer what Smith (1990b) describes as the local into the official, state-sanctioned versions.

The research objective and the research questions

The overarching objective of this research, namely to achieve an understanding of health information management in Australia, generated the following research questions:

1. What are the key societal and political influences that have shaped contemporary Australian health information management?
2. What are the implications, for Australian Health Information Managers and the shape of health information to be managed, of evolving organisational arrangements within the healthcare system?

Chapter summary

This chapter has identified Australia's health information management profession and the work of its members as an original, researchable problem that has not previously been examined. Acknowledging the centrality of the medical record, the chapter has revealed the development of the profession in Australia since the mid-20th century as being influenced by key, inter-connected societal and political forces that continue – unequally and in different ways - to shape and mould its direction. In Chapter 2, I explore these influences and associated, underpinning theoretical literatures. In Chapter 3, I describe the profession's work in the contexts of the social worlds of the medical record and health information. Chapter 4 outlines the methods used in the research and Chapters 5, 6 and 7 present the empirical findings. In Chapter 8, I present a discussion of the findings in the context of the literature and also offer conclusions. A diagram showing the flow of the dissertation is available for reference in [Appendix 1](#).

Chapter 2

Theoretical perspective of health information and its management

Introduction

In this chapter, key theoretical frameworks and insights are introduced with the aim to position health information management as it exists in Australia and to derive new theoretical underpinnings for the profession. Recalling Foucault's concept of the centrality of the medical record, we focus on the key influences on the development of the profession and on HIMs' work that were identified in Chapter 1. In a historiographical framing of the profession's origins, three of the major influences on its formation are explicated: scientific medicine; standardisation; and the hegemony of non-medical managers in healthcare. The other key influences on its further development are then addressed: bureaucratisation; the concept of the risk society and its derivatives; technologisation; commodification of health information; and consumers' rights concerning their health information. It will become evident that these societal and political influences on health information management are neither clear-cut nor unitary: to varying extents they are overlapping or entangled.

In addition to being grounded in its own practical, 'how to' world of health information science, informatics and classification, health information management also straddles other disciplinary strands. Whilst the theorists selected for discussion and critique in this chapter differ in their perceptions of society and health information and, indeed, some are not much concerned with the latter, their perspectives offer useful theoretical and societal insights for health information management.

Scientific medicine

It will be seen that scientific medicine has a deep connection to health information management. Scientific medicine's multiple conceptualisations and interpretations have shifted over the past century and, according to Berg (1995), incorporate notions of scientific medical practice, medicine as a scientific activity, scientific standards, 'scientifically generated medical knowledge and technology' (p.442), and 'scientific precision' (p.447) in gathering and classifying clinical data. For the purpose of this dissertation, I adopt a broad approach by recognising medicine's complexity and diversity, and the influences exerted by multiple, different 'sciences'. For instance, since the second half of the 19th century, medicine in Australia and internationally may be construed to have become

more 'scientific' gradually and through various means, viz: the emergence of the germ theory of disease; the introduction of laboratory-based science; new pathophysiological and biomedical measuring and diagnostic technologies; practice standardisation; and, in the last decades of the 20th century, the computerisation of healthcare, and epidemiological and clinical-empirical interpretations including evidence-based medicine (EBM) and evidence-based health (EBH) (Russell 1977; Pensabene 1980; Berg 1995, 1997b; Timmermans and Berg 2003a, 2003b; Berg and Winthereik 2004).

I posit here that scientific medicine was one of the factors instrumental in the creation of medical record librarianship. We recall the focus by the medical establishment - since the Enlightenment and intensifying since the mid-20th century - on the medical record as a central, enabling and supporting instrument. Intensely contested, medicine is 'negotiated and inevitably political' (Rosenberg 1999, p.35). The shift to a more scientific focus in medicine can be interpreted as a gradual, multi-faceted political process wherein 'scientific and technical elements intruded' (Willis 1989, p.91). Here, I adopt Gardner and McCoppin's (1989b) and Gardner and Barraclough's (1992) interpretations of politics and, specifically, health politics as the allocation of finite resources including valued goods and services; the attendant political process necessitates contested decision-making in order to resolve 'conflict between ... rival interests' (Gardner and McCoppin 1989b, p.7).

The medical record as a scientific technology

From the late 19th century, contestations around scientific medicine included the medical profession's internal struggles about its relationship with science and technology, and its desire to protect its members' reputations and according to Davis (1981), the public, from quacks and charlatans. Results from the new 'sense transcending' (Fredriksen 2002, p.71) technologies enabling incidental and time-series measurements of physiological functions began to appear in 19th century medical records (Davis 1981; Reiser 1991, 2000; Golan 2004). The medical record thus became a crucial scientific technology that provided objective evidence to 'clinicians as scientists' (Reiser 2000, p.36). As Rosenberg (2002), observes: '[i]n visualizing early 20th-century diagnostic practice, one thinks immediately of a hospital-based technology ... But nothing illustrates these gradual yet inexorable changes with more circumstantiality than the mundane case record' (p.245).

The early 20th century

Hospitals' clinical case records continued to play 'a critical role in advancing the practice and science of medicine' (Reiser 1991, p.906), including in medical education. A more widespread, early 20th century move to scientific medicine throughout Western countries was evident, according to Weisz (2003) and others (e.g. Foucault 1979; Berg and Harterink 2004), including in changes to the record's organisation. Indeed, as Timmermans and Berg (2003a) observe, the 'progress of medical science' (p.31) in the early 20th century was 'a more important reason for keeping medical records than the everyday care on patient wards' (p.31). Concurrently, a widely-held perception was that large populations could usefully be managed and categorised by classification (Weisz 2003).

Scientific medicine and hospital standardisation

Connected to the notion of scientific medicine, the hospital standardisation movement established 'minimal requirements to which every hospital should adhere' (Timmermans and Berg 2003a, p.9). Significantly, a central plank of hospital standardisation was accurate, complete and properly managed medical records whose achievement, according to Berg and Winthereik (2004), proved very challenging. The shift to standardisation, incorporating medical record design and notation, was highly contested within the American medical profession, as seen in Codman's experiences (refer Box 1).

Box 1 Codman

Ernst Codman (1869-1940), an American orthopaedic surgeon, was a vociferous proponent of medical records, scientific medical practice, hospital standardisation and efficiency, and data-based quality assurance (Neuhauser and Aron 2000; Kaska and Weinstein 1998). His 'End Result Idea' was based on analysis of medical record data and predicated on follow-up of patients' clinical outcomes (Codman 1914, 1917a, 1917b; Reverby 1981; Donabedian 1990; McLendon 1990). The surrounding contestations and tensions are reflected in his peers' resistance to his recommendations until such time as their uptake became politically expedient. Codman's ideas were ultimately reflected several decades later in Donabedian's (1966, 1969, 1973, 1980, 1982, 1988, 2003) theories, and subsequently integrated into international clinical governance and quality management practices, including in Australia (e.g. Wilson and Goldschmidt 1995; Wolff and Taylor 2009) and as reflected in hospitals' mandatory compliance with the National Safety and Quality Health Service Standards (Australian Commission on Safety and Quality in Health Care 2012).

The medical record thus emerged as a data repository for the enhancement of hospital standardisation and efficiency. Meanwhile, retaining its essential narrative purpose, the record continued to broaden in scope and format; this necessitated new 'institutional methods of record keeping and technological changes in information storage and retrieval' (Reiser 2000, p.36). Importantly, observe Berg (2004) and Timmermans and Berg (2003a), there arose a need for experts. These were the Medical Record Librarians (MRLs).

The 20th and 21st centuries

We now consider further connections between scientific medicine and standardisation, including the confluence between these and the influence of Taylor's (1967) theory of scientific management which focused on production efficiency through systematic scrutiny, standardising, and streamlining of work processes. This approach was adapted in healthcare to underpin the notion of 'efficiency as well-kept records ... to generate the type of medical history required for scientific medical care' (Mormon 1989, pp.1-2). It is important here to recognise medicine's close association with the concept of standardisation; for example, by the 1950s and 1960s, standards 'which set the minimum requirements of medical record systems ... catalogued patient files and uniformized diagnostic categories' (Berg 1995, p.448) (work undertaken by MRLs) and the 'scientifically designed' (p.448) *Standard Nomenclature of Diseases and Operations* (SNDO) (used by MRLs), were hailed as enabling accurate, standardised health statistical data beneficial to researchers, doctors, government agencies, healthcare planners, and epidemiologists. An emphasis on medical terminological standardisation in hospital records anticipated a need for documentary consistency connected to the emergence of computers that promised 'significant assistance in data retrieval' (Berg 1995, p.448). In similar vein, Weed (1970) asserted that the medical record 'must be a scientific manuscript' (p.vii). To this end, he designed the standardised problem-oriented medical record in the 1960s, aiming (generally unsuccessfully) to replace the source-oriented medical record and, according to Berg (1995), to enable doctors to 'act scientifically' (p.450). By the late 20th century there had emerged what appears to be a form of technological reverence whereby, as reported by Berg (1995), computers, algorithms and decision-support tools were promoted as being essential for scientific medicine.

Evidence-based medicine and healthcare

Prior to exploring further the influence of standardisation we divert briefly to EBM, ‘the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients’ (Sackett et al 1996, p.71). This also reflects connections between scientific medicine and standardisation. The paradigm of EBM derives from the early hospital standardisation movement and ‘the emergence of the patient-centred record’ (Timmermans and Berg 2003a, p.52) with the aim to achieve ‘uniformity and quality control by streamlining processes’ (p.8) and standardising for predictability and accountability. Timmermans and Berg see EBM’s emergence, since the 1970s, as a contemporary continuation of scientific medicine through imposed standardisation. By the late 20th century, medical practice continued to be seen as a ‘scientific activity’ (Berg 1995, p.449) equated with calculation and doctors’ medical record documentation. For Reid (1999), a leading Australian HIM, it is ‘axiomatic that information is integral to an evidence-based approach to clinical practice and to managing the health care system’ (p.123). Arguably, this foregrounds the wider dimension of EBH which involves ‘decisions about groups of patients or populations [...] based on best current evidence ... manifest as evidence-based policy-making, evidence-based paying for ... health services, or evidence-based management’ (Grey 2009, p.11). We note that EBH is also informed by HIMs’ classificatory, analytical, and quality management work.

Standardisation

The early 20th century’s hospital standardisation movement was imposed upon what Timmermans and Berg (2003a) infer was a resistant medical profession intent on maintaining professional autonomy. It can be argued that the pre-World War I societal move to efficiency through standardisation continues, in the 21st century, to connote predictability and accountability in a culture of rationality and control. We see this, for instance, in Australia’s predominant healthcare accreditation program⁸.

⁸ Operating since 1974, with Commonwealth Government approval, this incorporates multiple standards including those governing medical records, data, classification, and systems (e.g. The Australian Council on Hospital Standards 1976, 1977, 1978; The Australian Council on Healthcare Standards 2013).

This is also seen in the medical record data. By the mid-1900s, Western hospital medical records contained substantially more standardised, 'scientific' test and investigation data than 100 years previously (Newman 1959). Through the second half of the 20th century, medical record content continued to be seen as 'irreplaceable scientific data' (Berg, 1995, p.447). Deficiency in the 'scientific precision' (p.447) of medical records highlighted the need for greater standardisation of the records, classificatory systems, and terminology to underpin data production for medical research and its applications. Berg (1995) observes, however, that in the 1960s and 1970s some doctors perceived that standardisation would benefit the powerful interests of 'hospital administrations, insurance companies and government agencies' (p.451) and consequently undermine the medical profession's independence.

Contemporary standards are, for Timmermans and Berg (2003a), characterised by their ubiquity, multiplicity and specific, enabling processes. Aligned with and supportive of scientific medicine, standardisation and standards facilitate managers' work, support bureaucratic efficiency and control, and permeate health care and information. In the context of the current study, the phenomenon of standardisation is particularly important because standardisation and standards shape HIMs' work and outputs.

We now consider the influence on the formation of health information management of the phenomenon of the non-medical, accountability-focused healthcare managers.

The increasing hegemony of managers in healthcare

A review of historical accounts (e.g. Dickenson and Mason 1986; Watson 2013) indicates that the accountabilities of non-medical leadership in healthcare facilities were central to the establishment of Australia's health information management profession in the late 1940s (addressed in this chapter). By the 1960s, there emerged a need for new administrative leadership in the governing of Western countries' healthcare facilities. It will become evident that these accountabilities continue, increasingly, to be enabled and sustained through the work of 21st century HIMs.

Non-medical administrations emerged subsequent to increasing technologisation in hospitals, and complex governmental regulations and changing relationships between healthcare facilities, governments, and other payer organisations (Reiser 1994; Reiser and Banner 2003). These non-medical managers were ‘experts with special knowledge of management, economics, and business’ (Reiser 1994, p.29). Reiser and Banner (2003) assert that this shift constituted the new ‘hegemony of managers over providers’ (p.844). Contestation and tensions arose between medical and managerial interests as the ‘shift of authority ... produced a growing rivalry between professional and administrative personnel, intensified by differences’ (p.29) in their training and values. Indeed, this escalating corporate dominance and the consequences of the global information revolution contributed, according to McKinlay and Marceau (2002), to the ‘decline of the golden age of doctoring’ (p.379). In Australian hospitals, non-medical administrators assumed a central role. Having appeared in the latter half of the 20th century, they continue to depend increasingly on health information (Davis and George 1988).

Casemix-based funding

By the 1990s, some Australian state governments instituted healthcare system reform through financial leverage: for instance, a casemix-based funding model (a form of ABF) was introduced in Victoria in 1993 (Lin and Duckett 1997; Duckett and Willcox 2011; Swerissen and Duckett 2002). The operations of casemix-based funding rely upon a robust health information infrastructure⁹ and HIMs’ classificatory inputs and management. This model enables hospital accountability through Diagnosis Related Group (DRG)-based ‘comparative hospital performance’ (Lin and Duckett 1997, p.51) measurement. It will be seen that HIMs’ work underpins the operations of casemix-based funding, justifies healthcare facilities’ revenues, and mitigates financial risk. Later in this chapter, I posit that casemix can also be interpreted as an enabler of the commodification of health information.

⁹ An infrastructure underpins, represents, and ‘effortlessly supports [work], making possible collective accomplishment’ (Star and Bowker 1995, p.41). It is invisible, becoming ‘real’ (Star 2010, p.380) once galvanised by and in the context of organised practices (Jewett and Kling 1991; Star and Ruhleder 1996). An information infrastructure is a constructed artefact that effects human organisation, a ‘trace or record of activities’, or an ‘information-collecting device’ (Star 2010, p.387).

'A clash of concerns'

A mid-20th century crisis of medicine (coincidentally, the decade 1940-1950 during which medical record librarianship was introduced to Australia), was precipitated by increased technological means of treating disease and medicine's 'new economy of the body in the modern Western world' (Foucault 2004, p.7). During this era, the health of the population become a state concern in some countries, including Australia (Sax 1990)¹⁰. By the late 20th century there arose what Reiser (1994) terms a 'clash of concerns' (p.35) surrounding the balancing of healthcare resource interests of clinicians, researchers, administrators, and patients. Porter's (1997) assessment is apposite: by the 21st century medicine had 'at its cutting edge' (p.629) become embedded in 'complex infrastructures, bureaucracies, funding arrangements' (p.629). This brings us to medical record librarianship and the early MRLs. We begin by considering the aforementioned influences of scientific medicine, standardisation, and the hegemony of non-medical managers on the profession's formation and development. This discussion draws on various sources to derive connections that underpin the profession's development.

The emerging health information science

Requirements for medical documentation imposed by the drive for scientific medicine gradually rendered impractical the ledger-casebooks used in early 20th century hospitals (McWay 2008; Timmermans and Berg 2003a). The subsequent, escalating volume of medical record paper led to the 1916 development, in the USA, of the patient-centred unit record (UR) system whereby each patient's clinical notes were held in a separate folder (Howell 1988). The UR was, arguably, congruent with Foucault's (1973, 1979) perception of the centrality of the medical record and reflective of the contemporary standardisation and scientific management movements which promoted formal medical record systems. The UR, in different forms and media and aligned with a unique, numerical patient identifier, today remains the cumulative record of all clinical and demographic information about the patient (e.g. Murphy and Helbig 2012). Berg (1999a) and others (Berg and Winthereik 2004; Timmermans and Berg 2003a) observe that a new type of specialised worker was required to manage medical records, and classify and retrieve health

¹⁰ A 1946 amendment (Section 51[23A]) to the Australian Constitution empowered the national government to provide 'pharmaceutical, sickness and hospital benefits, and medical and dental services' (Sax 1990, p.16).

information to underpin standardisation, medical scientific practice, and knowledgebase building. Meanwhile, parallel influences of scientific management materialised in managerial and economic efficiencies espoused by the non-medical, hospital administrators.

The Medical Record Librarians

Amid the political interests of hospital standardisation and scientific medicine, medical record librarianship was established in the USA in 1928¹¹ with the objective to ‘elevate the standards of clinical records in hospitals, dispensaries, and other distinctly medical institutions’ (Huffman 1972, p.23; Berg and Harterink 2004; McWay 2008; Brodnik 2012; Watson 2013). These ‘record professionals’ (Timmermans and Berg 2003a, p.52) emerged to meet the needs of the American College of Surgeons for standardised, well-kept, classified medical records for its training programs and to support retention of the surgeons’ status by facilitating patient management and follow-up, and their control over hospitals.

The guardkeepers

From the outset, the MRLs operated on the boundary between hospital administration and the medical profession by establishing themselves as the authoritative ‘guardkeepers of proper medical record keeping, ensuring a system that was optimally configured to the needs of a modern hospital – whether or not this corresponded to physicians’ needs’ (Timmermans and Berg 2003a, p.42). This included supervision of doctors’ documentation work and, importantly:

reaching out to all parts of the hospital ... [to gather] all the facts about every patient ... thereby making it possible for the hospital superintendent to discover what kind of work his institution is doing (Timmermans and Berg 2003a, p.45, citing Whiting Myers 1932, p.64).

The MRLs adopted a managerial perspective by providing statistical and utilisation information to hospital administrators, and using the medical records as ‘interpretive documents’ (Timmermans and Berg 2003a, p.52) and data sources for the evaluation of hospitals’ ‘medical performance’ (p.52). This duality in the MRLs’ role, whereby they became insinuated in both healthcare managerial and medical interests, was not anticipated by any of the parties involved. In the words of Timmermans and Berg (2003a), ‘here was a group of nonmedically trained people, often women,

¹¹ Representing Canada and the USA, the Association of Record Librarians of North America was the predecessor of the American Health Information Management Association.

who were telling physicians how to keep their medical administration!’ (p.52). Henceforth, hospital standardisation that required improved documentation of care, including standardised, ‘accurate and complete case records to be written for all patients and filed in an accessible manner in the hospital’ (Waters and Murphy 1979, p.4), was a key component in 20th and 21st century American healthcare and later, as we shall see, in the Australian healthcare system.

The impetus for change in Australia

The impact on Australian hospitals of scientific medicine was evident in the massive expansion, from 1900 to the mid-20th century, of the volume of individual patients’ medical record documentation and the need for a uniform classification to facilitate case identification and retrieval of data for research, and for quality and performance-related follow-up (Dickenson and Mason 1986). Australian hospitals needed standardised hospital systems and practices (Ell 1984; Watson 2013).

The establishment in 1946 of the peak body for hospital administrators, the Australian Hospitals Association (AHA), was politically driven in a period of structural change affecting the hospital sector (Dickenson and Mason 1986). Contemporary hospital medical administrators wished to deter encroaching federal government involvement in hospitals and their funding, which they saw as precipitating the erosion of hospitals’ autonomy and their own decision-making. Espousing ‘higher standards, greater efficiency and improved conditions for patients’ (p.4) - and reminiscent of the American experience - the AHA (led, incidentally, by medical administrators) acknowledged that better medical records and systems would facilitate improved hospital and staff performance monitoring. It therefore promoted hospital standardisation and advocated more advanced medical record-keeping as part of ‘the scientific revolution in medicine on hospital administration’ (p.17).

Medical record librarianship in Australia

In the late 1940s, the AHA facilitated an infrastructure for the management and standardisation of Australian hospital medical records and classification systems. Following the American model and the advice of Edna Huffman, a leading American MRL, it adopted a suite of initiatives including the structured training and employment of specialist MRLs and a hospital standardisation program (later termed ‘accreditation’) (Dickenson and Mason 1986; Watson 2013). The MRLs’ role was

custodial and classificatory (Watson 2013). Watson's (2013) comprehensive historical account reveals that professional associations, established in the states of New South Wales and Victoria in 1949, merged in 1955 as the Australian Federation of Medical Record Librarians (AFMRL)¹².

We conclude that the shift to a more scientific form of medicine in Australia was partly enabled by the mid-20th century establishment of the medical record librarianship profession. It was further shaped by the continuing trend in the 1950s and 1960s of portraying medical practice in the public perception as 'scientific'. The MRLs were complicit in reifying scientific medicine; for example, Ell (1984) and Watson (2013) report that the MRLs' conferences and education programs enjoyed the patronage of medical academics and hospital medical superintendents. We now catch a glimpse of the Australian medical record librarianship profession in the mid-1970s.

'Once we were (Medical Record) Librarians'

The following scenario is derived from published materials, discussions with colleagues, and comments of participants in this research (Acheson 1972; Gledhill 1972; Race 1972; Wilkinson and Armstrong 1980; Huffman 1981; Johns 2002b; Timmermans and Berg 2003a; Watson 2013).

Box 2 Australia's hospital Medical Record Librarians, circa 1975

We are in the Medical Record Department of a large, public hospital. A suite of inter-connecting, basement rooms within the main building, it houses 60 staff members including five (female) MRLs. Each is identifiable by her AFMRL badge, imprinted with her registration number and affixed to the lapel of a knee-length white hospital coat that designates paramedical professional status.

An adjacent, cavernous room houses the 'primary file' vaults of tens of thousands of patients' colour-coded medical records filed in terminal digit order on tall rows of grey-metal open shelving. The weight of the files determines the Department's basement location. The Master Index is a separate central, card-file system housed in a wall of grey filing cabinets. Held in perpetuity, it holds full identification and critical non-diagnostic facts on each patient, present and past. The Department buzzes with activity. Medical record clerks push trolleys heaped with the unassembled medical records of patients discharged from the wards in the previous 24 hours. Clerks at rows of desks

¹² This ultimately became the Health Information Management Association of Australia.

systematically process and assemble records: they sort, check and order forms, results, reports, and clinical correspondence, and communicate by telephone with ward nurses to locate documents. Finally, they staple on each assembled record a 'deficiency list' (Huffman 1981, p.104) of actions for completion before sign-off for filing. Other clerks file or retrieve medical records, or sort and affix clinical test and investigation reports. Some deal with porters and other staff, come from elsewhere in the hospital to collect a record for the Operating Theatres, Outpatient Department Clinics or research projects. A clerk sets out for the secondary storage area in the basement of another building.

There are intersecting flows of people, lists, medical records, and forms. Clerks answer constantly ringing telephones. Following the Casualty Department's request via intercom, a clerk retrieves a record from the primary file and sends it, whooshing and thunking, via the pneumatic tube that links 'Medical Records' to 'Casualty'. Another clerk sends a record via the mechanical 'dumb waiter' to the hospital Admissions Office directly above. Others verify and register new patients' details, allocate UR numbers, and prepare medical records to await their subjects' attendance. Clerks deal with lists of bookings for the specialty Outpatient Department clinics; they retrieve, prepare, check, 'track'-back, and re-file records. The hospital's paging system crackles and blares irregularly.

In a quiet room, rows of medical typists in headphones tap on electric typewriters, transcribing discharge summaries and clinical correspondence dictated by the doctors. The adjacent Doctors' Room has 'doctors' boxes' - cubed shelving packed with medical records awaiting discharge summary completion. White-coated doctors sit, dictating; they come and go, frequently interacting with transcriptionists and MRLs.

The MRLs, in half-glassed offices around the Department's periphery, hold various portfolios. Some operationalise the Medical Record services, managing staff and sections of the Department, overseeing routine processes, and maintaining the Policy and Procedure Manual. Using the international *Standard Nomenclature of Diseases and Operations*, the MRLs also classify discharged patients' diseases and operative procedures. Painstakingly, they then manually 'index' codes and demographic details into the Disease and Operation Index, a vertical file that accommodates the multi-axial (topographical/anatomical, aetiological, operative) nomenclature. The system of cross- (rather than simple-) indexing is designed to provide doctor-researchers with a full picture of each patient under study, including cross-referenced disease and operation details. Some MRLs assist

doctors in research: searching the index, they ascertain cases, review records to determine individual case relevance to the research topic, provide records, and advise on source codes and idiosyncrasies.

Two MRLs are members of the hospital's Medical Records Committee, one being its secretary; it is chaired by the Medical Superintendent. Another MRL manages batch-reporting of the hospital's data to a state collection point; data are entered by a specially trained clerk and transmitted by telex. The MRL reconciles the data and deals with anomalies by telephone and mail. Another MRL undertakes the hospital's routine statistical analysis and reporting: she retrieves the midnight 'Bed Returns' from senior nursing staff in each ward; analysing details of patients admitted, discharged, transferred and died, she cross-references against multiple daily lists before producing operational and utilisation statistical reports for the hospital's Manager. The medico-legal MRL, liaising with the Medical Superintendent, manages release of medical records subpoenaed for court cases. Another MRL guides the bureaucratic processing of death and cremation certificates, pursues doctors for documentation, deals with police (Coroners' cases), and co-ordinates paperwork to facilitate funeral directors' collection of deceased patients.

All systems are manual; the MRLs have contemporary knowledge of computers and engage in professional development to learn programming but the size, speed and cost of computers limit their use in hospitals. The MRLs occupy a central place in the hospital hierarchy: the Chief MRL reports to the Medical Superintendent, who reports to the hospital Manager. The MRLs' bureaucratic, specialised work is essential to patient care, research, utilisation monitoring and, increasingly, accreditation.

This scenario reflects what many participants in the current study referred to as the hospital HIMs' 'traditional' role. It represents Australian medical record librarianship near the end of the era of fully paper-based records and manual systems, and at the dawn of change bringing healthcare computing and patients' rights to access their records. Watson (2013) nominates the following decade, the 1980s, as historically the most important for the profession in Australia owing to the expansion of quality assurance, accreditation, and computerised health information systems. Concurrently, community- and consumer-based structural interests, as described by Gardner (1989), were propelling legislation requiring public hospitals to open up medical records to their patient-subjects.

Having established the origins of the profession in Australia, we now turn to other key influences on its development, the first being health information management's relationship with bureaucracy.

Health information management and bureaucracy

Bureaucrats are the Einsteins of society. They make incommensurable frames of reference once again commensurable and translatable

(Latour 1996, p.181).

I adopt here the Weberian interpretation of bureaucracy. Bureaucratisation in healthcare, explained by Weber's (1947, 1963) theories including his notion of 'administrative authority' (1962, p.113), facilitates and legitimates the increasing collection and applications of data that characterise and enable what Giddens (1985) describes as the modern nation-state. Bureaucracy strengthened its grip on Western healthcare in the 1960s, subsequent upon funding pressures. The rationality inherent in Weber's (1963) bureaucracy promotes efficiency, as will be seen in health information management environments and work. From the outset, the MRLs' dual managerial-bureaucratic and classificatory role undertaken in response to the early-mid 20th century requirements of scientific medicine for institutional systems of medical record management and coded data was linked to the medical profession's political interests and the interests of hospital administrations.

Standardisation is implied in bureaucracy. Importantly from the health information management perspective, Weber's (1991) document-centred concept of 'office' (p.197) is grounded in files and their expert management (and we envisage the management of medical records in various formats) and in the career-vocation of office-holder (wherein we see the HIM) which requires specialised management training, commitment, loyalty and the technical learning and application of rules (Miller 1963; Weber 1963, 1991).

Weber's (1963, 1991) bureaucratic organisation relies upon intellectual means for consistency, systematisation and, according to O'Neill (1986), rationality and calculus. The importance of calculable rules brings to mind Thrift's (2004, 2008) qualculative framework (introduced in this chapter), and HIMs' health data-related calculations. From the early 20th century, bureaucratic routines were developed to accommodate the requirements of the modern hospital (Timmermans and Berg 2003a). Medical records 'constitute an anonymous and bureaucratic collection of details

concerning the private lives of individuals' (Heath 1982, p.70), and Bowker (2000) reminds us of Latour's (1987) theory that the work of science is 'an eminently bureaucratic practice deeply concerned with record-keeping' (Bowker 2000, p.647). Furthermore, the clinico-bureaucratic context of HIMs' work can be seen in Rosenberg's (2002) observation that diagnosis 'remains both a bureaucratic and an emotional necessity — for records, for reimbursements, and for the coordination of complex intraprofessional and institutional relationships' (p.256).

Bureaucratic power and HIMs

Bureaucracy is seen by Weber (1963) as according considerable power to whoever controls its apparatus. Arguably, this notion envelops HIMs' power in their 'bureaucratic management of disease' (Rosenberg 2002, p.254) wherein, according to Rosenberg and reminiscent of Foucault, '[n]osological categories play an indispensable administrative role' (p.254). Rosenberg describes the transformation, through classification, of the diagnosed patient into the bureaucratic milieu: '[o]nce diagnosed, that bureaucratic and technically alienated disease-defined self now exists in bureaucratic space, a simulacrum thriving in a nurturing environment of aggregated data, software, bureaucratic procedures, and seemingly objective treatment plans' (p.257). Mechanic (1962) interprets Weber as suggesting that position-based prestige correlates with others' reliance for information upon the expert's skills, alliance-forming, commitment, and 'willingness to use power' (p.364). It is also seen where the expert – and we interpose the HIM – is difficult to replace. The extent of this dependence hinges on the importance to the organisation of the areas where control is exerted; arguably, in health information management these include medical records, databases, health information, DRGs, and other data. This notion of dependence on the expert also has consonance with Drucker's (1998, 2006) knowledge worker, discussed in Chapter 3.

Contra-views

Bureaucracy's rigidity and domination (through knowledge) create the iron cage (as described by Weber), an impediment to change (Poster 1990; Allen and Pilnick 2005). Bureaucracy is seen somewhat disparagingly by Poster (1990) as 'a crude form of data storage and retrieval system' (p.38). Its consequences, advises Tsoukas (1997), include masses of objective data available from administrative records giving the favourable but not necessarily accurate impression of extra bureaucratic 'insight and understanding' (p.5). A further limitation arises in the traditional

bureaucratic model wherein management's efficient procedural instructions become idealised and inadequate for the conduct of dynamic, co-operative work arrangements that require 'problem solving activities and negotiation with co-workers' (Schmidt and Bannon 1992, p.23). Acknowledging widespread anti-bureaucratic sentiment, including the privileging of organisational efficiencies that can appear antithetical to bureaucratic organisation, du Gay (2000) defends bureaucratic administration's 'mundane routines' (p.17) against the contra-arguments of the late 1970s and 1980s; for over a century, he asserts, bureaucrats have borne 'a real responsibility for the efficient and economic use' (p.135) of resources. This aligns with what HIMs do, thence leading us to consider a post-bureaucratic milieu accommodative of ever-increasing demands for organisational efficiency and accountability.

Technogovernance

Arguably, the HIMs' role has evolved in the 21st century into technogovernance, whereby medical record documentation and its guidelines are seen as part of 'a bureaucratic model in which professionals' behaviour is shaped and manipulated by tight regulatory policies' (Martin and Sinsky 2016, p.1). These include funding pressures which in the past two decades have permitted health bureaucrats, including HIMs, to demand a greater say in how records and data are managed.

The importance of files

I leave the last word to Latour (1987): paperwork dominates, is inevitable, and is essential to the functioning of society. He reminds us that it is within dull and boring files – and we recall that most Australian hospitals have components of paper-based medical records - that 'the results of science travel the furthest' (p.255). Herein lies the work of HIMs; a conundrum arises in the shift to mobile, electronic files which turn medical records into resources that span times and places, and enable dissemination of the mobilised 'results of science' (p.255). This progression from the stability, predictability and relative immobility of paper to EHRs and other forms of electronic and digital health information and their enabling technologies necessitates major change and brings associated risk to the HIMs' roles. Changes to systems, processes, modes of information and ways of managing data and information necessitate the management of these risks. The HIMs' ordering

work therefore becomes a risk management device. These considerations lead us to another of the key influences shaping health information management: that is the risk society.

The risk society

The risk society is characterised by inherent and increasing risks created largely by science and technological change, and reflects what Beck (1992, 2013) terms a new, reflexive modernity. Risks represent ‘the probabilities of ... harm due to given technological or other processes’ (Lash and Wynne 1992, p.4). The current study observes HIMs operating in this rapidly changing environment that evolved from the obsolescent industrial society (Beck 1994). Indeed, the future:

looks less like the past than ever before and has in some basic ways become very threatening ... The notion of ‘risk’ is central to modern culture ... New areas of unpredictability are created quite often by the very attempts that seek to control them (Beck, Giddens and Lash 1994, p.vii).

The dominant risk society of the 20th and early 21st centuries is propelled by uncertain, post-modern characteristics including increasing disorder and potential loss (Giddens 1991; Turner 1997; Williams and Calnan 1996; Gephart, Van Maanen and Oberlechner, 2009). Amid notions of speed and change, Bauman (2005) sees this ‘liquid’ (p.1) modernity as portraying a risk society whose prevailing conditions change faster than its members’ adaptive capacities (in Cooper and White 2012). Individuals, and occupational and professional groups - and here we interpose HIMs - experience ‘growing opportunities to have a voice’ (Beck 1994, p.23) and compete for ‘the emerging shaping power of the political’ (p.22). The uncertainty created by these new risks – including, according to Beck, in health - demand active risk management. The risk society ‘privileges communications and circulation’ (Lash 2002, p.112) and, plausibly, includes the mobilisation of health data and information. This presents potential risk for HIMs’ management of access, privacy, EHRs and, we will see below, the effects of emerging “big data” technologies.

It is apposite to note that at another level, HIMs’ risk management is connected to the influence of increasing hegemony of the aforementioned non-medical healthcare leaders and managers, which is driving increased information-based accountabilities, financial resourcing of healthcare, and clinical, managerial and organisational outcomes. In the late 20th and early 21st centuries, there have emerged in Australia and elsewhere greater emphases on allocative efficiency, specifically technical efficiency (via ABF models) and effectiveness of healthcare through optimisation of the

ratio of outputs to health outcomes (Dickenson and Mason 1986; Duckett and Willcox 2011; Timmermans and Berg 2003a). Within these contexts, I also interpret the notion of risk and its accountabilities to underlie the rational, managerial focus on efficiency in the healthcare system. Reminiscent of – but distinct from – Weber’s bureaucratisation, this is further exemplified through the influences of the aforementioned scientific management.

The HIMs’ management of risk is reflected in recent American trends towards the embedding of what Kadlec (2014) and Gordon (2015) describe as a new health information governance structure. This features an overarching, organisational framework for health data and information that accounts for strategic, operational, custodial, quality, safety, regulatory compliance, financial, and environmental requirements and is linked to the concept of HIMs’ health information stewardship role (Dimick, 2014; Downing 2016; Kadlec, Warner and Washington 2014; Kennedy 2014b; Weinberg et al 2015). Another emerging practice is clinical documentation improvement, the objective being continuous improvement of the quality and clarity of the medical record for its purposes in research, funding, and clinical governance (Arrowood et al 2015). These developments involve the HIMs’ (re-)ordering of health data and information, and establishing and managing the systems to achieve this. We recall here the utility of Durkheim, Mauss and Douglas’ theories, presented in Chapter 1, in situating and interpreting HIMs’ informational ordering work in an environment of risk.

Next: the network and information societies

Access to information is becoming more important, and here we consider HIMs’ facilitation of patients’ legislatively enabled access to their medical records. Beck’s risk society preludes and underpins Lash’s (2002) information-centric network society. The latter is characterised by machine-based and networked surveillance. New boundaries differentiate between those with and without access to information (Lash 2002). The network society supports digitisation in health and foregrounds the emerging concept of “big data”: ‘frivolous, meaningless, and unstructured data ... collected and stored next to meaningful data’ (Dooling, Osborne and Wiedermann 2014, p.61). Characterised by massive increases in volume, and speed of transmission, this is frequently portrayed glowingly as having potential to add value in clinical, research, personalised medicine, genomic, patient safety, and cost dimensions in ‘all healthcare settings’ (Fernandes, O’Connor and

Weaver 2012, p.39; Raghupathi and Raghupathi 2014). The creation of high-value health data, including from “big data”, is enabled by data analytics which reflects the societal shift from interest in accessing data and information to concern with coping with the large volumes of data facilitated by this access (Kennedy 2013). American HIMs (e.g. Birnbaum 2015; Gordon 2015; Sandefer et al 2015) opine that their HIM colleagues are well-positioned to leverage their deep knowledge of health data lineage, flow, and quality to support and undertake predictive analysis; arguably, this view might apply also to Australia’s HIMs.

“Big” (or growing amounts of) data, and data analytics, can be reflected in the HIMs’ constant ordering through re-calculation and re-processing of data and facts. “Big data” offers potential benefits congruent with Lash’s (2002) positive observation of objects (e.g. data repositories) as holding societally stabilising traces. Conversely, it unmasks the risk society’s unintended consequences, especially threats to privacy; on a cautionary note, health law authorities such as Terry (2012, 2015) warn of “big data’s” significant risks to data integrity and security, and patient privacy. Arguably, “big data” exemplifies the privileging of technologies inherent in Latour’s (1996) theory of the object (following) and, concordant with Foucault (1979), Poster’s (1990) superpanopticon that dominates through surveillance via electronic databases. We now divert briefly to Latour’s (1996) theorising on the place and the rights of objects.

Latour’s theory of the object, and the agency of things

Arguing for the rights of objects, Latour’s (1996) theory of the object hybridises, privileges, and semi-humanises things, including technologies – and here we interpose health classifications and medical records, including EHRs - and redistributes agency to them. When applied to the UR in its electronic, digital (scanned), and paper guises, Latour’s theory would ascribe to it an embodied status that reflects and personifies the patient, his or her body, diseases, and treatments. Contending that objects do not exist independently of human practices, Lash (2002) challenges Latour’s (1996) acknowledgement of the tensions surrounding the human agency invested in technologies. We note, diverting momentarily to HIMs’ enlivening of the medical record through their specialised work, that Lash (2002) sees objects as ‘repositories of memory, of traces, of tradition’ (p.55). In contextualising these characteristics within the realm of health information

management it becomes evident that his argument that objects restabilise society, and possess depth and continuity despite their apparent mechanistic status, is important in bringing to life the medical record as the illness story and re-creation of the patient's body: 'Objects in their past-ness ... are much more than resources, but also traces, artifacts, memories' (p.54). This also echoes the reflexive processes of (re-)embodiment described by Giddens (1991). Significantly, both Latour's and Giddens' concepts can be applied to HIMs' roles in accumulating and processing the scientific facts of the patient.

The post-modern mode of information

We are alert to implications for HIMs' roles in managing access to, and the linkages of, institutional, state and national health datasets and individual medical records. Poster (1990) critiques what he sees as Foucault's failure to acknowledge that 20th century information technology (IT) effectively generates 'a system of surveillance without walls' (p.93): this he calls the post-modern, post-industrial mode of information. Its 'impoverished, limited language' (p.94) is embedded in digital coding and 'rigidly defined ... fields' (p.96) that create data relationships only in the database, thereby posing a threat to individuals' privacy. This has particular relevance to HIMs' stewardship of health databases, potential involvement in "big data", and responsibilities for the privacy of the information contained therein and produced therefrom. As intimated, their technological, data, record, and classificatory work involves the (re-)production and ordering of scientific facts. This is scientific work.

Scientific work

The production of scientific facts, consonant with Latour's constructivist perspective, results from scientists' actions in their everyday work (1987, 1991; Latour and Woolgar 1986). His scientists are canny articulation workers (Latour 1987). At this point, we note that articulation work¹³ juggles and manages the unexpected, gets things 'back on track' (Star and Strauss 1999, p.10), and accommodates contingencies and workarounds to substitute for gaps or failings in information systems (Bowker and Star 1999; Star 1995a, 1999; Berg and Timmermans 2000; Schmidt and

¹³ Articulation work, highly complex and demanding, also involves managing three critical components of the information space: people; objects (e.g. boundary objects, systems, and standards); and the outcomes of distributed work (Bowker and Star 1999; Schmidt and Bannon 1992).

Bannon 1992). Scientific workers – and, again, we interpose HIMs - enrol allies to network-build, establish facts, or technologise. Berg (1996a) observes that Latour's notion of translation acknowledges unpredictability and involves mediation and strategic negotiation. Inadvertently foreshadowing Thrift (2004, 2005, 2008), Latour's (1987) concept of an accumulation cycle involves the calculation, re-calculation, refinement and processing of scientific facts in different ways, times and spaces. Latour's scientists undertake what Lynch (1985) terms complex 'rendering practices' (p.38) to transform documented information into calculable forms. Brown (1995) intimates that Latour's theory offers reduced value in light of healthcare's multiple human interactions. Notwithstanding this reading by Brown, and in view of Latour's (1987) acknowledgement of the centrality of technologies, files, and translation of documented information, I suggest that Latour's 'science in action' approach presents a useful constructionist lens for viewing HIMs' extensive work practices to produce scientific facts from health data. Bearing in mind the embeddedness of calculation in HIMs' work (including in the traditional role illustrated above), we now explore this concept further.

Considerations of space and time

Calculation is ubiquitous in human life (Thrift 2004). It is also ubiquitous in the work of HIMs. Thrift (2004, 2008) traces its journey - to a new, qualculative underpinning of the way of thinking - from the fifth century BC to the 19th century inventions of filing systems and listings, and the 20th and 21st centuries' computerisation and surveillance. Calculation and its derivatives involve ordering and re-ordering: 'qualculation' allows multiple (even millions of) calculations to be made 'in the background of any encounter' (Thrift 2004, p.584). This is effected via quantitative calculations ranging from counting, numbering and listing to more complex 'analytical and transformative operations' (p.583).

Data integrity

We also recognise HIMs' work in Thrift's (2008) concept of 'transcoding' (p.92). This enables data integrity through consistency and immutability of data quality in qualculation work, wherein 'lists, records and arrays can be generated and ... will mean roughly the same thing at all points in a network. They can also be translated into other formats' (p.92). Health Information Managers strive constantly for data integrity through calculating, coding, analysing and technologising. In the 21st

century, these efforts may exemplify the change from manual writing, classifying, list-making and index creation - as seen in the traditional HIM role (Box 2) - to constant engagement with computers, analytics, specialised software, and standardising mechanisms. Future possibilities are (part-) automated health classification and increasingly rationalised health data collection systems (e.g. Meystre and Huag 2006; Moriyama, Loy and Robb-Smith 2011; Pakhomov, Buntrock, and Chute 2006; Ward 2006).

The fluidity of health information in the risk society denotes ongoing change and, assumedly, the HIMs' constant ordering through re-calculation and qualculation. Looking to the future, Thrift (2004) predicts 'new forms of intuition' (p.596) and rapid reasoning. He acknowledges implicit uncertainty in handling large datasets (and here we recall the problems with "big data") and argues for retaining the ability to deal with 'messiness ... difficulties, uncertainties, inaccuracies' (Thrift 2005, p.474; 2008). This approach resonates with the HIMs' behaviours and objectives in truth-seeking amid the mess and uncertainties of health data. It also presents challenges because health information is context- and content-sensitive and, according to Moser and Law (2006), distributed in 'different material forms and organisational arrangements' (p.67).

Technology, which recursively supports, enables, and creates HIMs' work, is another key influence on health information management's development and progress.

Technology and technological change

In recent decades, the ever-expanding capacities and capabilities of information and communication technologies (ICTs) have transformed healthcare, including medical records and health data (American Health Information Management Association 2003; Heath, Luff and Svensson 2003). Suchman, Trigg and Blomberg (2002) observe that new digital and electronic media bring significant functional, operational and practice changes. These also enable EHRs, new health information systems, databases, and classificatory and calculatory decision-support systems. In enhancing the reach of HIMs' work including data and classificatory outputs, technological developments also enable contemporary scientific medicine.

Technology and its culture(s)

As Bijker, Hughes and Pinch (1987) caution, technology is 'a slippery term' (p.3) and 'technological change' (p.3) is heavily interpretive. They offer three constituents of technology, introduced in Chapter 1, which I apply here to HIMs: (physical) artifacts or objects, which may be construed as medical records, classifications, and health information systems; processes and activities, interpreted as the HIMs' work and the health information ecology; and peoples' 'know-how' (p.4), constituting the HIMs' professional and technical knowledge and skills.

The earlier description of Australian hospital HIMs' work in the 1970s foreshadows the profession's transition to adoption of the computer as a 'general purpose machine' (Agar 2006, p.882). These developments have embedded themselves in the HIMs' world by computerising and supporting components of their knowledge work and enabling complex calculations. This reminds us of Weiser's (1991) observation that '[t]he most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it' (p.94). This is reinforced by Agre's (2001) observation of the infiltration of computing into 'the rest of life' (p.178).

Health informatics

We have noted the pivotal health informatics role of HIMs. An 'evolving socio-technical and scientific discipline' (Whetton 2005, p.27), health informatics relates to the 'collection, storage, retrieval, communication, and optimal use of health-related data, information, and knowledge' (p.27). Brodnik (2012) contextualises health informatics within health information management as:

the use of information technology and computer science in health care. As health care has come to rely on such technology and science, informatics has become an important domain of practice within the HIM profession (p.44).

At technology's cultural frontier

Health Information Managers operate at the technological cultural frontier. This can be seen through the lens of Braman's (2007) notion of a cultural frontier as represented in the move from print to digital technologies. Culture (societal, organisational and professional), is significant amongst the multiple barriers to technological innovation and change. Its most important component in the context of HIMs' work is the social-human element as identified by Rogers

(1995), Coiera (1999), and Hill (1991). Hill (1991), for example, sees technology as shaping organisational culture through linking the productivity and social components of organisation. For healthy technological change, he observes, technological alignment with cultural expectations of performance must be privileged over the 'technical rationalist script of efficiency' (p.111). This implies consideration of the socio-technical aspects and also foreshadows some concerns expressed by participants in the current study.

Bringing order to the human-machine interface

There is long-recognised acknowledgement of the socio-technical relationships between person, machine and other users (e.g. Trist and Bamforth 1951; Pasmore 1995), and the technical change inherent in social innovations (Law and Callon 1988). Orr's (1996) landmark investigation of machine-people relationships reveals that human technical knowledge is a socially distributed resource; similarly, Suchman and colleagues (1999) describe reconstructing technologies as social practice (p.392). Overwhelmingly, the literature endorses the systems' human user-inputs and informational-outputs when designing, implementing and managing health information systems (e.g. Kling 1991; Berg et al. 1998b; Ash and Berg 2003; Berg, Aarts and van der Lei 2003; Coiera 2004). These interpretations align with Star's (1999) belief that the texture of technology-dense society is woven through the infrastructural details: this resonates with HIMs' implementations of health information systems in complex cultural environments. Ultimately, no technology, including the medical record and related artefacts, 'functions according to the ideologies of efficiency and technological rationality: messy, real-time work is necessary for any technology to persist' (Berg and Timmermans 2000, pp.51-2). This realistic acknowledgement of mess resonates with the ordering and purifying efforts of HIMs foreshadowed in the Chapter 1 discussion of the theories of Durkheim and Mauss (1963), Durkheim (1995) and Douglas (1966).

Consonant with the HIMs' across-distance system implementation presented in Case Study 3 (Chapter 7) are the findings from Law's (1986) seminal study concerning the need for management of socio-technical allies over distance, and from Ellingsen and Monteiro's (2006) revelation of the region-wide, disorder-inducing effects of politically imposed standardised systems, including Patient Administration Systems [PAS]) implemented in local healthcare settings. Bearing in mind Latour's (1987) aforementioned scientific work, and continuing the reference to the HIMs'

technological implementation work reported in Case Study 3, and also to their other work across distributed, area health networks, we now introduce Hutchins' (2014) theory of distributed cognition. Accounting for a large component of scientific work, this theory acknowledges human beings' capacities to develop inter-connectedness in their work practices.

Transforming technology across distance

Health information system implementation is inherently difficult because it involves, according to Berg (2001), the mutual transformation of technology and organisation. Successful implementation and management of health information technologies necessitate adoption of Berg's (1999b, 2001, 2004) iterative approach to organisational change, and a focus on users' needs as opposed to a standardising, rational approach that is blind to the complexities and messiness of clinical work. Bearing in mind also that Latour's (1987) scientific work is achieved via inscriptions and distributed cognitive activity across groups and networks, it is of interest that Hutchins' (1995, 2001) theory of distributed cognition opens us to understand the relationships between 'what is in the mind and the world the mind is in' (2001, p.2068). Hutchins observes that cognition emerges from distributed processes, subsequent to humans' interactions in three potential dimensions: across social groups; with material environments and artifacts; and temporally (Hutchins 1995, 2001, 2014).

Hutchins (2012) adopts Hall and Horn's (2012) definition of 'concepts' as recurrent patterns of focused work occurring amongst people and technologies. We might therefore consider Hutchins' (1991, 2014) perceptions of concepts and knowledge evident in practices 'in the wild' (Hutchins 2001, p.2068; 2012, p.315) as a potentially useful approach to thinking through HIMs' negotiation, establishment of new work configurations, and support of organisational stability and resilience. It is timely also to foreshadow the HIMs' across-distance 'imagining work' (in Case Study 3).

Imagining work

Hutchins (2014) notes the importance of 'imagining' (p.40), such as in the practices of reading and writing, their spatial layouts, and their link to what he terms the cognitive ecosystem. This has consonance with Mackenzie's (2003) description of the collaborative imagining undertaken across distance by telecommunications workers 'crossing the digital divide' (p.369) to produce seamless

electronic communications. Mackenzie observes that '[t]he integrity of a system has to be imagined, because it cannot readily be seen or articulated' (p.369). Both MacKenzie's concept and Hutchins' theory arguably apply in health system implementations where the HIMs co-operate across distance in a real-time activity and act as the 'connecting tissue that holds the hardware and the technological system together' (Tjora and Scambler 2009, p.523; Rooksby, Rouncefield and Summerville 2009).

Returning to the socio-technical interface, we segue to the social construction of technology (SCOT).

Socially constructing technology

In arguing a social constructivist approach to the study of science and technology, Pinch and Bijker (1984, 1987) acknowledge the interactions of people and social groups and their interpretations of technology (technological frames [Orlikowski and Gash 1994]), with technologies and their design, implementation, and use. The SCOT concept of 'interpretive flexibility' holds that individuals and groups ascribe different meanings to an artefact (e.g. a hybrid medical record, EHR, or other health information system). Technological systems, posits Hughes (1987), are multi-faceted and challenging to their human creators and operators. Constituting technical, social, economic, and political 'messy, complex, problem-solving components' (p.51), they are 'socially constructed and society shaping' (p.51). Once again, we see mess and complexity in need of ordering within a complex environment. This draws to our attention a problematic in the area of science and technology.

Further perspectives on technology

Health Information Managers produce scientific facts through their abstraction, classification and analysis of patients' individual or collective medical details. This exposes the fundamental importance to their work of inscriptions and documentation. In this context, we recall Latour and Woolgar's (1986) seminal study of what Berg (1996a) calls 'the inner workings of science' (p.252), alluded to earlier in this chapter. There is a problem, in science and technology, concerning the boundaries between organisms and environments (Star 1988). This has generated interest, in the late 20th and early 21st centuries, in the production of scientific facts, artifacts, and texts and the

abstract concept of opening up the 'black box' (Pinch and Bijker 1984, p.404) of technology to understand systemic, scientific or technological functioning (Pinch and Bijker 1987; Latour 1999; Winner 1986).

Technology remains dependent on human intelligence, and HIMs' work remains contingent on intelligent sense making. Bemoaning the continuing techno-scientific focus in medicine, Fredriksen (2002) opines that although beneficial, technology cannot substitute for human judgement. Similarly, Nardi and O'Day (1999) caution against the technophilic perspective that creates a 'rhetoric of inevitability' (p.17) in objectifying humans and curtailing critical assessment of optimal use of technology. Equally, they decry the self-limiting, dystopian magnification of the social effects of technology that impedes progress. Favouring Latour's (1987) and Callon's (1986) post-modern critical approach to technology as text, Nardi and O'Day privilege an holistic, ecological approach accommodative of technological development and its social implications, where individuals – and again we envisage HIMs - engage actively within their own information ecologies.

Risks of health information technology

The volume and speed of electronic communication of health data are problematic, as is the imposition of 'disparate and proprietary systems with limited functionality' (Dooling, Osborne and Wiedermann 2014, p.60). Dooling, Osborne and Wiedermann (2014) observe that '[a]ll data are not created equal and technology implementation alone is not enough to improve the healthcare provided to patients' (p.60). Kadlec (2016), in the USA, observes that the 'massive' (p.36) growth in health IT precipitates a need for greater efficiencies in use of the data captured; to this end, she observes, HIMs need to 'capitalize on their existing analytical skills' (p.36).

Health Information Managers utilise a raft of technologies in restoring data order from disorder to produce official facts, and protecting patients' health information privacy. This exposes inherent risks as seen, for instance, in Virilio's (1999, 2006) acknowledgement of technological innovation's capacity to enhance peoples' lives, and his simultaneous caution against the notion that unrestrained expansion of the technological culture will achieve mass social and economic problem-solving. Virilio warns, darkly, that society is decomposing in the overwhelming presence of faster, more intrusive technology. His concern about the speed of technological solutions,

consistent with the aforementioned network and information societies, precipitates what Lacy (2014) interprets as 'crisis informatics' (p.104; Loy 2007). In other words, Virilio argues that technologisation is being falsely promoted as restoring, on its own, order from mess. This foreshadows observations of some participants in this research (e.g. Chapter 5).

We turn now to the remaining influences on health information management, and begin with the recognition of health consumers' rights in the late 20th and early 21st centuries.

Health consumers' rights

Erosion of trust is potentially damaging to the effectiveness of health care and, according to Mechanic (1998), may attract governmental micro-management via regulatory mechanisms. In Australia, state interventions in recent decades accord consumers of healthcare services a degree of self-actualisation and rights to health information autonomy. In practice, these rights levy an increasing duty of trust on the HIM-custodians of health information. One component of state intervention enshrines the patient's legislated right to health information privacy, and another involves access to medical records.

Health consumer engagement strengthened in the early 1970s in Australia, waned and then regained traction in the mid-1980s as an enabler of accountability in the healthcare system, evidenced in patients having a greater say in the experiences and outcomes of their care (Duckett 1984, 2007; Duckett and Willcox 2011, 2015; Hill and Draper 2011). Gardner (1989) and Duckett (1984) share the view that the interests of health consumers (previously described as non-medical equal-health advocates) are determined by the prevailing economic policy and political ideology.

Health information privacy

Decisions regarding what health information may be accessed, and by whom, as well as timeframes and administrative details including processing costs, are managed by the HIMs and informed by the law. This component of health information governance is also underpinned by HIMs' ethical obligations; extant since the beginnings of the profession, these are enshrined in its practice guidelines which are hinged on bioethical theories and principles (Health Information Management

Association of Australia 2015). In turn, these mechanisms inform the HIMs' shaping and development of organisational policies and enabling procedures and practices for screening, monitoring, and controlling the privacy of and access to patients' medical records and information. It will be seen in Chapter 7 that these resonate with the experiences of the HIMs described in Case Study 3 who successfully argued to replicate 10 PAS databases rather than allow patients' information to be viewed, without consent, by staff members in other facilities throughout a regional area health network (AHN).

Since the late 1980s, the custodial role of Australia's HIMs has become more complex to accommodate a raft of Commonwealth, state, and territory legislation that enshrines and controls confidentiality and privacy of medical records and health data and information in the public and private healthcare sectors¹⁴. Kennedy (2014a), in the USA, describes HIMs' absolute duty to protect patients' information privacy. This, she observes, is a core professional value and accountability. We reference here Everett Hughes' (1971) interpretation of the term 'profession' as denoting prestige or value. Correspondingly, professional or occupational bodies mandate behaviours that govern their members' responsibilities and power:

[m]ost occupations cannot be carried out without guilty knowledge ... The lawyer, policeman, the physician, the reporter, the scientist, the scholar, the diplomat, the private secretary, all of them must have license to get and, in some degree, to keep secret – some order of guilty knowledge (p.288).

The HIMs are the behind-the-scenes people entrusted with patients' confidential health and treatment details, and the implementation and management of the supporting systems. This brings derived privileges of the kind described by Kleinman (1988): 'One of the great privileges of medicine is to be given access by the patient to the intimacy of his life' (p.237), and concomitant responsibilities. Australia's HIMs often have responsibility for organisation-wide privacy management (Privacy Manager or Privacy Officer) (e.g. Ritchie 2002). Maintaining the privacy of health information is particularly challenging; Mendelson (2003), for instance, identifies numerous stakeholders in or contributors to the medical record. With regard to EHRs, privacy-related matters

¹⁴ Examples include: Privacy Act 1988 (Commonwealth); Privacy Amendment (Enhancing Privacy Protection) Protection Act 2012 (Commonwealth) and Australian Privacy Principles; Health Records and Information Privacy Act 2002 (New South Wales); Health Records (Privacy and Access) Act 1997 (Western Australia); Health Records Act 2001 (Victoria); Information Privacy Act 2009 (Queensland); Personal Information Protection Act 2004 (Tasmania).

extend to system and operational security, sensitivity of system design, mechanisms and procedures governing consent to access the record, anonymisation of data (for researchers), standards, and directives; useful accounts of these can be found in Grain (2004), Jirotko et al (2005), Win and Fulcher (2007), Fernández-Alemán, et al (2013), Rezaeibagha, Win and Susilo (2015). These bring to mind the need for focus on the cybersecurity of health data and information, including prevention of hacking and theft (Dill, Lucci and Walsh 2016).

Access to medical records

Society's focus on self-identity and the body as representing the reflexivity of modernity, as explicated by Giddens (1991), underpins the trend in Australia since the 1980s to legislative enabling of patients' access to their medical records and a rigidly proscribed involvement in their production, i.e. notation of amendments. Freedom of Information and related laws in Commonwealth and state jurisdictions pertain to public and private healthcare facilities and their patients¹⁵.

We now progress to the last key influence identified in Chapter 1: commodification of health information.

Commodification of health information

Commodification concerns how 'ways of meaning traditionally associated with very specific domains of production' (Iedema 2003, p.13) are being used outside those contexts, often involving market exchange factors. In introducing the notion of commodification in the context of health information, I suggest that it is nascent and, in light of bioethical and legal constraints, tightly circumscribed. Berg (1997a) observes the commodification of the EHR in the sense that one of its driving forces is commercialisation, illustrated in international IT corporations selling the EHR product. For the purpose of the current study, I exemplify the aforementioned efficiency-focused,

¹⁵ Examples include: Freedom of Information Act (1982) (Cwth); Freedom of Information Act 1982 (Vic); Freedom of Information Act 1991 (SA); Freedom of Information Act 1992 (WA); Government Information (Public Access) Act 2009 (NSW); Health Records Act 2001 (Vic); Health Records and Information Privacy Act 2002 (NSW); Health Records (Privacy and Access) Act 1997 (ACT); Information Act (NT); Right to Information Act 2009 (Qld); Right to Information Act 2009 (Tas). Note that statutes in some jurisdictions relate to both privacy and access.

ABF funding models. Here, coded data representing patients' diseases and healthcare services are transformed by HIMs into financial currency that underpins hospitals' and health services' funding.

Activity-based funding

Following the 2009 recommendation by the national Health and Hospitals Reform Commission, the Australian states and territories adopted a broad ABF model for healthcare institutions (Duckett and Willcox 2015). Its components, according to Duckett and Willcox (2011, 2015) and Eagar (2011a, 2011b) are classification, counting, and measuring of activity, and costing of activity in the provision of care and treatment. These necessarily demand a complex information infrastructure. Casemix is a form of ABF and clinical case complexity-based funding of healthcare services. Created by Fetter and colleagues in the 1970s in the USA, it was ostensibly a quality initiative until introduced by governments, including in Australia, to control escalating healthcare costs. Useful accounts of casemix developments can be found in Fetter, Thompson and Mills (1976), Fetter and Freeman (1986), Fetter (1999) and Duckett (2009). The summary in Box 3 shows that casemix-based funding – driven by socio-political and technical-economic factors - has become a measure of technical efficiency whereby hospital outputs can be described against costs of treatment (Bardsley 1987; Duckett 2007, 2009; Duckett and Willcox 2011; Jackson et al 2015).

Box 3 Casemix - an example

Casemix-based funding of public hospitals was introduced in the state of Victoria in 1993 (Duckett 2007, 2009; Duckett and Willcox 2011). Health insurance funds later adopted it for reimbursing private sector hospitals. Casemix in Australia hinges largely on the *International Statistical Classification of Diseases and Related Health Problems, 10th Edition, Australian Modification* (ICD-10-AM) and the Australian-Refined-Diagnosis Related Group (AR-DRG) classification. Its operation relies upon timely, accurate and comprehensive clinical coding and formal statutory reporting by HIMs who also index the codes into dedicated hospital databases. Separately, they assign the codes into DRGs which attach to nationally-derived cost-weights. They then apply software-enabled algorithms to calculate the expected payment to the hospital for each patient (Price and Robinson 2011). Hospital HIMs also undertake rolling, internal clinical (re-)coding and DRG audit programs to ascertain coding accuracy, identify variations, and maximise revenues within legal constraints (Cheng, Shephard and Robinson 2005). Shephard and Moore (2010) exemplify the Victorian situation where the Department of Health's (DoH) reporting accountability is to the state Auditor-General. As funder, the DoH undertakes a rolling, external, public hospital clinical coding and DRG audit

program for financial governance. Private hospital proprietors commission their own external audits to ensure coding accuracy and revenue maximisation (Price and Robinson 2011).

Reid (1991) identifies a multi-faceted, technical relationship between disease and procedure coding, and DRGs. In this context, specialised casemix-related work has engaged Victorian HIMs for almost three decades (e.g. Hindle, Cook and Pilla 1989; Mitchell 1990; Reid et.al. 1991), and those in other states and territories more recently.

Foreshadowing the discussion in Chapter 3 of a standards-based universal order, we can see that the rationalising tool of the DRG algorithms, underpinned by cost-weights for case-types, produces case uniformity in the relationship between treatment provided and cost of hospitalisation. It also enables scientific calculation (or, after Thrift [2004, 2008], *qualculation*) of patient throughput, resource consumption and costs in different specialties, and revenues justified, foregone and projected. Essentially, the DRG algorithms discipline the HIMs' casemix analysis work and make it more scientific. At another level, the AR-DRG classification system reflects constant changes in healthcare service type and provision, and pricing models, and offers opportunities for efficiency and quality of care (Balnave and Reid 2007; Dimitropoulos and Madden 2014). The coded data, *albeit* highly mobile, constitute a summarised representation of the rich canvas that is the medical record.

This brings to a close the discussion of the key, dynamic and, in most cases, continuing influences on the formation and development of health information management. It is opportune to introduce the law of medical information which affords a point of departure for this exploration of the Australian HIMs' roles.

The law of medical information

There arise many practical issues in the behind-the-scenes work that produces medical record data for its secondary uses. Berg and Goorman's (1999) law of medical information asserts that the further that the information that is created, collected and held in the medical record needs to be dispersed for subsequent use in different contexts and for different purposes, the greater the work

required to disentangle it 'from the context of its production' (p.52). They observe that disentangling and mobilising health information to a wider arena constitutes, consonant with Latour's (1987) thinking, 'a core component of scientific work' (p.57). The meanings and significances of medical record data are contextually-bound: elicited from the patient at point-of-care, these details form the record and then morph through many stages across-organisation and -healthcare system into multi-purposed, different forms. The translating and processing of health data and information require intimate knowledge of health information systems and practices (Berg and Goorman 1999). I foreshadow that the HIMs' disentangling includes myriad aspects of their work undertaken throughout the healthcare system.

Chapter summary

This chapter has presented key influences on health information management's formation and development: scientific medicine; standardisation; non-medical managers; bureaucracy, including technogovernance; the risk society and its derivatives including the information society and the post-modern mode of information; technology and technological change, and theories relating to the machine-human interface, and SCOT; health consumers' rights; and the commodification of health information. The chapter has revealed that from its beginnings, Australia's health information management profession has been a critical enabler of scientific medicine, clinical practice, and research. Equally, it has enabled managerial efficiency in healthcare. Many aspects of the HIMs' work are reflected in the literatures introduced in this chapter, including the theories underpinning their scientific, calculation, and qualculation work. Ultimately, it is proposed, this disentangling and (re-)ordering work, introduced in Chapter 1 with the theories of Durkheim, Mauss and Douglas, is further framed in a more contemporary sense by Berg and Goorman's (1999) law of medical information.

Chapter 3

The ecology of health information management

Introduction

We recall from Chapter 1 that this dissertation examines the work of HIMs within the ecology of Australian health information management. We revert now to Nardi and O'Day's (1999) information ecology, foreshadowed as a key theoretical consideration in the current study. Nardi and O'Day (1999) adopt a biological ecology as metaphor for the information ecology which they see as the dynamic functioning of the socio-technical components of organisation. Scaled to individuals, their information ecology is a system of 'people, practices, values, and technologies in a particular local environment' (p.49). The metaphorical ecology in the current discussion represents the culture of health information management within the healthcare system.

The health information ecology

The focus in the health information management ecology is on the human activities that technology supports and serves, rather than the technology *per se*. These activities of HIMs are characterised by some diversity, co-evolution of social and technical components accommodative of new tools, functions and expertise, and change-adaptation within a constantly re-balancing environment. It is posited that the HIMs inhabit a health information ecology that embodies Baker and Bowker's (2007) information ecology, specifically its tripartite of data (structuring work), knowledge (infrastructuring work)¹⁶ and information (the infrastructure). This conceptual framework incorporates the HIMs' infrastructuring work on the UR, data collections, datasets, information systems, knowledge making, classifications, social networks, and what Baker and Bowker term 'digital federations' (p.127).

This chapter introduces the concept of HIMs as a keystone species within the health information ecology and, in this context, explains the attendant problem of invisibility and the issue of accountability. The theory of social construction is then introduced as an explanatory device to frame the HIMs' production of the "facts" and the "truth" of the patient. Theories of knowledge transaction and of translation work are then introduced. In their constant ordering, the HIMs rely

¹⁶ Baker and Bowker (2007) bundle articulation and intermediation work, and work-arounds, as 'infrastructuring' (p.139) work. This 'in-between' (p.140) liaising work, absent fixed boundaries, mediates and links science, data, and technology.

upon some key ecological features; these include boundary objects and boundary infrastructures such as the UR and its forms, health information standards, classifications, and audits. In acknowledging this central role involving patients' information, the notion of trust emerges as HIMs create order from disorder in their social construction of the "facts" of the patient.

Keystone species

Keystone species are essential to a biological ecosystem's survival; metaphorically, they are similarly essential to the survival of Nardi and O'Day's (1999) information ecology and, by extrapolation, to our health information management ecology. Keystone species have the skills required to support organisations' effective use of technologies. They – and we interpose HIMs – are capable communicators and facilitators who can teach technological uses and applications to others. Surprisingly, they do not necessarily require extensive computer experience, but they need to be adaptable and flexible in accommodating technologies. Essentially, they technologise. The keystone species comprises mediators who build bridges 'across institutional boundaries and translate across disciplines' (p.54), thereby undertaking essential boundary work¹⁷ and shaping the technologies to the organisation's and its members' needs. Paradoxically, their boundary spanning work is frequently unrecognised and may be seen by others as peripheral to the organisation's more visible operations (Nardi and O'Day 1999). In other words, keystone species, such as HIMs within a health information ecology, can be invisible.

Visible and invisible work

The phenomenon whereby the HIMs' re-constitution, disentanglement, and interpretation of patient information become invisible presents one of the challenges associated with this exploration of the world of health information management. An analogy can be drawn with the innovative and creative work undertaken by librarians and information managers. This, observe Baker and Bowker (2007), is difficult to define and, consequently, attempts at disintermediation have failed; they recommend attention to the centrality of the ongoing work of liaison and

¹⁷ A "boundary" is a shared space and a boundary "object" something that individuals, computers or other objects (e.g. technologies) 'act toward and with' (Star 2010, p.603). There is focus on transitions and connections 'between spatial regions' (Tellioğlu and Wagner 2001). Boundary objects and systems may morph into boundary infrastructures, standards and processes (Star 2010; Bowker and Star 1999).

intermediation¹⁸, because the information manager – and we read the HIM - is typically ‘dropped out of the equation’ (p.140).

‘Front-stage’, ‘back-stage’

Invisible work can be seen as shadow work (e.g. Illich 1981). This resonates with Egan’s (1994) perspective whereby the ‘shadow-side’ of an organisation represents the space encompassing the informal arrangements. Citing Goffman’s (1959) concepts, Star and Strauss (1999) describe ‘front stage’ (p.21) work as visible and ‘back stage’ (p.21) work as negotiated, historical and problematic. Essential background work, the latter incorporates functions absent from formal procedural documents, and facilitates and underpins day-to-day social life (Star and Strauss 1999; Bowker and Star 1999; Nardi and Engström 1999; Nardi and O'Day 1999).

Invisible work can be perceived as complex by those undertaking it and, contrastingly, as stereotypical or simple to those not involved (Suchman 1995; Muller 1999; Star 1999). Whereas the work may be seen to be done, its attendant taken-for-grantedness relegates it to invisibility, as seen with librarians and secretaries (Nardi and O'Day 1999; Star and Strauss 1999). Denmark’s medical secretaries, who Bossen, Jensen and Udsen (2014) describe as information keepers, constitute a noteworthy example. They undertake invisible CSCW and informatics-based, articulation work in medical record management, classification, and EHR implementation. Acknowledging the centrality of the medical secretaries’ work to the hospital, Bossen, Jensen and Udsen argue the benefits of visibilising this to enhance and support changing, co-operative work arrangements within the electronic space.

No work is inherently visible or invisible (Star and Strauss 1999). The key question, observes Muller (1999), is ‘invisible to whom?’ (p.49): the parameters of visibility may be negotiated and subject to the individual’s discretion, autonomy, and power over resources. Trade-offs and greater visibility in one area may precipitate the opposite effect elsewhere, e.g. creating hidden costs of increased paperwork (Star and Strauss 1999; Bowker, Timmermans and Star 1995). Alternatively, where the work is visible the worker may be an invisible, objectified ‘non-person’ (Bowker and Star 1999,

¹⁸ Intermediation work, according to Ehrlich and Cash (1999), is largely invisible.

p.15). New technologies, according to Bishop (1999) and Sachs (1995), progressively drive the change from synchronous, manual work to flexible, mobile working environments, and may generate a shift in how management views previously invisible work. Significantly, invisibility extends beyond the workplace¹⁹.

Becoming accountable

Workers may visibly undertake invisible work, referred to by Star and Strauss (1999) as 'disembedding background work' (p.15). A balance may be needed between visibilising the work and leaving it hidden: once visible, some work can become 'a target' (Star 1999, p.386) for accountability. Accountability, for Suchman, Trigg and Blomberg (2002), references individuals located within historically constituted and embedded 'orders of accountability, administered through ... regimes of organizational and institutional control' (p.165). They acknowledge records as central technologies which shape work actions and re-construct organisational histories and practices including record-keeping. In healthcare, accountability involves hospitals' 'efficiency and effectiveness' (Degeling 2000, p.3). Inevitably, this incorporates the HIMs' responsibilities; e.g. the need for visible accountability is deeply connected to their ABF-related work, whereupon they must justify their organisations' revenues or, in the case of those employed in health insurance companies, the appropriateness of financial disbursements.

Socially constructing health information

Diagnosis labels, defines, and predicts and, in doing so, helps constitute and legitimate the reality that it discerns

(Rosenberg 2002, p.240).

It is timely at this juncture to introduce the social construction of health information and its relationship to HIMs' work in establishing the "truth". Berger and Luckman's (1967) theory of social action combines Durkheim's and Weber's positions to explain how human beings' socially constructed realities are produced by their subjective experiences and meanings. In Weber's (1947) view, subjective meanings inform and shape activities.

¹⁹ For example, when applied to the health information management profession within the wider society: (a) Health Workforce Australia's (2013) health information workforce report reveals a less-than-comprehensive understanding of HIMs' work; and (b) the national Productivity Commission's (2005) report on Australia's health workforce is silent on HIMs, citing data on healthcare system outcomes some of which are derived from HIMs' work; the profession is subsumed, invisible within the residual category of 'some 200,000 administrative and service workers' (p.xvi).

Berg and Goorman's (1999) law of medical information, introduced in Chapter 2, suggests that the HIMs' conversion of medical record content into factualised data for secondary purposes requires considerable extra (intermediation) work beyond the clinicians' original documenting (Baker and Bowker 2007). In observing that UR data are stored in various databases and used for research, Berg et al (1998a) emphasise the necessity for a data manager 'to insure [and access] high quality data' (p.246). The complexities of the data require 'active, interpretative work' (p.246) to effect their translation from their primary context of production and release from their fixedness in the immutable medical record, to enable legitimate secondary uses by multiple individuals and organisations.

The social construction of diagnosis

Rosenberg (1999, 2003, 2006) repeatedly describes the reductionist approach to disease (and its classification) that involves the ongoing re-invention and expansion of contested categorical boundaries and their reification in language and social practice. He concludes that this reconstruction – and we envisage HIMs' work - is so deeply embedded within medicine's negotiated politico-cultural arena that consensus about the acceptance of a given disease is pre-requisite to 'nosological consensus' (2006, p.420). There is inherent difficulty in fully representing the body in diagnosis and code, as exemplified in the diagnostic uncertainty and messiness of mental health, wherein patients' '... pathologies are rarely clear-cut and certainly never simple' (Grob 1998, p.218; Lock 1997). This is seen in the HIMs' (re-)construction of the classification, such as in the work of the State-wide ICD Coding Committee (Chapter 7). It is also evident in temporal and geographical changes in diagnostic labels which create complexities for scientific and historical research; for example, Newman (1959) and Bowker and Star (1999) remind us that many previously documented conditions are difficult to identify in the context of modern diagnostic labels, and Bharadwaj, Atkinson and Clarke (2007) observe that the problem of shifting nosographies is compounded by 'new', yet-to-be classified genetic diseases.

A mythical construct

The assumption that disease, diagnosis and illness are ontological phenomena rather than more-or-less arbitrary socio-cultural constructions has been contested. Fox (1986) opines that illness is primarily 'a mythical construct, created and enforced by the society' (p.391). In particular, she

observes, it is created and perpetuated by the 'oppressive' characteristics of the medical profession and the 'bureaucratic and technological features of the hospital itself' (p.391). Arguably, the medical record and the work of HIMs are integral to these institutional arrangements for care, and central to the construction of medicine, the patient's body, and the embodiment of the patient in code. The empirical findings of the current study will reveal that HIMs are deeply involved in, and responsible for, the social construction of diagnosis. They actively sustain enabling bureaucratic practices and technologies. This notion of social construction of disease, diagnosis and illness, according to Bury (1986), challenges the neutrality of medical science and Foucault's (1979) paradigm of rationality in medical thinking and practices. Brown (1995) usefully differentiates between the social constructions of *medical knowledge (disease and diagnosis)* and of *illness*. The former incorporates HIMs' classificatory and interpretive work, whereas patients' illness experiences are beyond the scope of the current research. Diagnosis, made from the 'technical-scientific standpoint of the biomedical model' (Mischler 1984, p.6), constitutes what Brown (1995) describes as the voice of medicine. This is the formal voice with which HIMs engage.

Diagnoses (and their codes) as bureaucratic imperative

We recall our earlier discussion of the bureaucratically-based power of HIMs. Rosenberg (2002) ascribes a social power, in administration and medicine, in the naming of disease: this practice is central to the hospital's internal order. Like Fox (1986), Rosenberg reminds us of the centrality of bureaucracy in healthcare, including bureaucratisation of disease and an associated, logically consistent focus on its boundary management and disputes. I posit here that the innate arbitrariness of ICD-10-AM and other classification systems references the need to hide the way that the 'mess' and disorder (of UR, patient, and diagnoses) are converted into codes, such that the legitimacy of those codes is not threatened. Rosenberg's disease entities become embodied as accumulated bureaucratic data, created, managed and reported by HIMs. Furthermore, diagnoses and by extension, DRGs, structure and legitimise bureaucratic relationships in a computer-based world:

[b]ureaucracy has become increasingly dependent on the deployment of numbers and categories; thus data management provides another kind of tissue in a late 20th-century disease's social body. Advocates of the computer in the clinic have worked eagerly to digitize, rationalize, and ultimately help link diagnosis, prognosis, and therapeutics, intensifying a tendency already well under way before the computer era (Rosenberg 2002, p.249).

The bureaucratic infrastructure of classification and other mechanisms is embedded in the public and private health sectors, including governments and the health insurance industry. The classification socially constructs and influences what is diagnosed and documented in the medical record, what is coded, and how it is coded. This connection will become apparent in the HIMs' contestations around classification, presented in the empirical findings.

(Non-)construction of silence

In establishing a diagnosis, doctors use medical language and shape the patient encounter around technical problems (Waitzkin 1989). Their documentation, however, is selective and, we are reminded by Berg et al (1998) and Poirier et al (1992), governed by exigencies of day-to-day health workplaces including time constraints, clinicians' difficulties in negotiating the structure and organisation of screen- or paper-based forms, and partial or arbitrary recording. There are inevitable omissions, which remain silent. The silences cannot be abstracted, coded, analysed or reported by the HIMs; these omitted diseases are lost to follow-up, the population-based datasets, and research.

Constructing big-picture health data and information

Silences also occur in other parts of the health information management ecology. For instance, epidemiology depends, at government, population and hospital levels, upon standard disease categories for classifying morbidity and mortality (Rosenberg 2002). In challenging the accuracy of some population health data, Zola (1966) identifies a flaw in the classificatory supra-structure: many disorders evade managerial detection. As the official health statistics only represent 'treated illness, we rarely question whether such data give a true picture' (p.615). Best (1989) also questions the constructed nature of disease prevalence statistics. In like manner, population-based statistics on disease incidence and costs create, argues Rose (2009), both 'realities' (p.78) and consequences. Exemplifying via psychiatric illnesses, he observes that 'numbers render a space governable yet contestable' (p.78), such as opposing perceptions of the data as reflecting a rising burden of mental illness and, contrastingly, as demonstrating the 'medicalization of normality' (p.78). In the context of these challenges that infiltrate and propel the social construction of health information, we now explore further the HIMs' search for the "truth" of the patient.

Searching for the truth

The health information management literature sees the medical record's inscriptions as constituting the official, literal record of the patient's details (e.g. Brodnik 2012; McWay 2014; Huffman 1972). Medicine, Zola (1972) also argues, is the 'repository of truth' (p.487) in which ostensibly neutral experts objectively exercise judgements. This supposedly apolitical process is linked to the medicalisation of daily life that, in turn, is grounded in the 'complex technological and bureaucratic system ... [leading to] reluctant reliance on the expert' (p.487). We should not take this to mean that all that is written in the record should always be accepted as the "truth". The socially constructed nature of documented health data presents a challenge in the search for truth which, per Foucault's (1980) reading, is contingent:

Truth is a thing of this world: it is produced only by virtue of multiple forms of constraint. And it induces regular effects of power. Each society has its regime of truth, its "general politics" of truth: that is, the types of discourse which it accepts and makes function as true, the false statements, the mechanisms and instances which enable one to distinguish true and false statements, the means by which each is sanctioned, the techniques and procedures accorded value in the acquisition of truth, the states of those who are charged with saying what counts as true (p.131).

As previously intimated, in light of Foucault's all-seeing panopticon the UR, as a 'mechanism of political technology' (Paternek 1987, p.108), disciplines, inscribes and observes the patient's body throughout its every encounter with the healthcare system. Foucault's (1983) concept of power is associated with producing 'the truth of the individual' (p.214): monitored and supported by state surveillance, this concerns preservation of health and life. The HIMs contribute to the social construction of the "truth" of disease through their abstraction, interpretation, classification, analysis and reporting. This is subsequent to the doctor's abstraction whereby the patient is reduced to 'an external fact' (Foucault 1973, p.6) in recognition of the primacy of the pathological truth. We might imagine other readings of this, such that the patient is metaphorically cast aside, or reinvented and re-embodied via the UR, codes, and statistics. The HIMs seek and value "truth" in healthcare as a core professional accountability, including for reasons of patient identification and data validity for statutory reporting, research, and financial management. The "truth" is, invariably, socially constructed.

Applying knowledge and expertise to establish the truth

In constructing the “truth”, the HIMs - immersed in data and information - create order and approved, sanctioned “facts” from mess and disorder. This occurs in an intensively knowledge-based industry in which technologisation, according to Drucker (1998, 2006), keeps shifting the emphases of work to knowledge creation and intellectual content. Kenney (1996) and Schultze and Stabell (2004) conclude that healthcare organisations therefore need to generate, represent, store, transform, apply, embed and protect their knowledge. This processing of knowledge, as described in Geisler’s (2007) typology of organisations and their members who transact knowledge, involves the discrete stages of generation, transfer, implementation, and absorption. There are three types of knowledge transactors amongst workers who undertake knowledge-intensive activities: generators; transformers; and users (Geisler 2007; Kidd 1994). The transformers are the ‘people, units, and organizations who transfer, share, transmit, and exchange knowledge to and from sources internal and external to the organizations’ (Geisler 2007, p.88). It will become apparent that HIMs undertake a complex transforming role.

Middle, and specialised, management

Middle management, wherein many HIMs reside and undertake transforming work, is of critical import to organisation. Its role is antithetical, opines Lash (2002), to the information society’s characteristic ‘dumbing down’ (p.49). Middle management adds value by re-creating information through summarising, editing, interpreting, synthesising, complex problem-solving, and using experientially-based judgement and perceptions (Hilmer and Donaldson 1996). Middle managers’ key communication and interpretation work, observe Hilmer and Donaldson (1996), is generally not replaceable by technologies, a position synergistic with Drucker’s (2006) concept of the knowledge worker.

More advanced technologies and increasing volumes of data in information-based organisations create the need ‘... to engage in ... “information” – even more intensively or risk being swamped by the data we generate’ (Drucker 1998, p.3; Beatty 1998). This approach is sympathetic to Tsoukas’ (1997) aforementioned perception of bureaucracy’s proliferation of data. In consequence, the networked information organisation in post-modern workplaces will, Drucker predicts, accommodate more positions in specialist management. This accords with HIMs’ specialised roles:

‘Converting data into information thus requires knowledge. And knowledge, by definition, is specialized’ (Drucker 1998, p.5). Mindful of this concept of the knowledge worker, we now explore HIMs’ translation work which, Berg (1996a) informs us, is ‘a form of strategic negotiation’ (p.254).

Models of translation

Translation work is analogous to Star’s (1983) observations of translation from disorder to order, and the simplification processes that fragment ‘ill-structured problems’ (p.207) to bring order from chaos. Health Information Managers need to undertake specific work in order to have their behind-the-scenes classification, calculation, and other functions taken seriously. This can be exemplified through Callon’s (1986) demonstration of the sociology of translation as the role of ‘science and technology in structuring power relationships’ (p.197). Translation constitutes:

... the mechanism by which the [different] worlds progressively take form ... [also permitting] an explanation of how a few obtain the right to express and to represent the many silent actors of the social and natural worlds they have mobilized (Callon 1986, p.223).

Callon identifies four ‘moments’ (p.203) of translation. In *problematization*, the key players become indispensable ‘in an obligatory passage point’ (p.204) in network relationship building and identifying alliances. The second stage, ‘*interessement*’ (p.206), involves positioning allies within the alliances and establishing social structures to achieve mutual goals and a balance of power. ‘*Enrolment*’ (p.211) involves multilateral negotiations: when representatives speak for others, the latter are silenced, necessitating ‘continuous adjustments and devices of *interessement*’ (p.216). The fourth stage is *mobilisation of allies* and their representatives. The key players work continuously at forging alliances.

In extending Callon’s model, Star and Griesemer (1989) conclude, in their information ecology model, that scientific work is heterogeneous and co-operative, embracing important strategic alliances. They identify methods standardisation, the establishment of alliances, and the development of boundary objects as critical activities for translation work. Star’s (1987-1989) notion that key types of boundary objects such as repositories and standardised forms (and we interpose the UR, health databases, and medical record forms), incorporate standardisation is extended by Lee (2007), for whom boundary negotiating also enables methods standardisation. Later re-visiting the boundary object, Star (2010) interprets it as allowing different groups ‘to work

together without consensus ... for information and work requirements' (p.602). These theories are borrowed to frame the case study of HIMs in an area health network (Chapter 6), who identified passage points and established strategic alliances to facilitate their scientific work.

The HIMs' achievement of the socially constructed "truth" of the patient results from their translation and transforming work. In the next part of this chapter, we consider some critical components underpinning health information science in practice. These core boundary objects and boundary infrastructures are central to HIMs' constant ordering and truth-seeking work within the health information ecology. We begin with the medical record.

Boundary objects and boundary infrastructures

The Unit Record

The UR, introduced in Chapter 1, has expanded substantially since its origins. By the end of the 20th century, Dick, Steen and Detmer (1997) contextualise it within the wider patient record 'system' and:

The set of components that forms the mechanism by which patient records are created, used, stored, and retrieved. A patient record system ... includes people, data, rules and procedures, processing and storage devices ... and communications and support functions (p.56).

In fact, the 'patient health record' is 'a primary source of health data and information for the health care industry ... paper-based, electronic, or a combination of both [and] referred to as a hybrid record' (Brodnik 2012, p.44). Hybridity²⁰ implies that a single UR has components in different formats, media and locations; arguably this multi-physicality challenges the concept of the unitary medical record and presents problems for users, including HIMs, in locating relevant data. In the 21st century, we observe a focal shift to health data in the health information management literature²¹. Emphasising data's uses, Murphy (2001) artificially splits the UR into the 'primary' (original) record and the 'secondary' (derived) record (p.693). These reflect the stages of the UR's progression: the latter category includes data abstracted from the record in its post-clinical guise,

²⁰ The hybrid UR, commonplace in healthcare facilities, incorporates components in any combination of paper, digitised (scanned), and electronic documents or database(s) (McWay 2014; Murphy and Helbig 2012).

²¹ Brodnik and others (e.g. Johns 2002b) prioritise the data-information-knowledge hierarchy: '[d]ata refer to raw facts, characters, or symbols that, when organized and processed to produce meaning, result in *information*. *Knowledge* is derived from information after it is organized, analyzed and synthesized' (emphasis in original) (Brodnik 2012, p.44).

for use in supporting administration, finance, clinical risk management, and quality-audit functions. There are multiple categories of clinical, epidemiological, demographic, financial, research, reference, and coded data within or derived from the UR that fall under the auspices of health information management (Brodnik 2012; Johns 2002b). They form a legal record of care provided, enable assessment of the effectiveness and efficiency of care, support financial reimbursement, gird strategic planning for healthcare services, and inform public health surveillance, policy development, and research. It follows that HIMs need to manage the medical record and health data and information within these increasingly diverse settings.

The medical record as a central artefact

The multi-layered and multi-dimensional medical record, which, according to Poirer et al (1992), has spatial dimensions and multiple functionalities, can be observed from different perspectives. For convenience, the hospital record is exemplified here: an integral part of organisational routines, it is documented by clinicians on approved screen- or paper-based proformas and according to established formats and structures. Primarily, the record is 'an internal document, a data base, and a means of communication across professions, the geography of the hospital, days and weeks, and even hours of night and day' (Poirer et al 1992, p.19).

Producing, representing and regulating patients' bodies

Notwithstanding its many flaws, including physical fragmentation and variations in form, format, mobility and content, the medical record is the official, formal narrative of the patient's illness. A physical, structured 'device' (Berg 1996b, p.510) for the distribution and collection of health information, the UR also describes, guides and reifies the patient's trajectory. Furthermore, according to Berg and Bowker (1997), it represents and relates the patient's history and the geography of his or her body. Whilst the record is widely considered to be a disembodied, technological, reading and writing artefact, Health and Luff (1996) and Berg (1999a, 1999b) observe that for decades it has been recognised as being central to, and an organising tool of, clinical practice. It is a 'crucial' (Berg 1996b, p.501) site in the socio-technical organisation of medical work, modelling 'the work to be performed' (p.405) and mediating and transforming the social and clinical relations that 'act and work through it' (p.501). It follows that the UR's various forms and screens (whose administrative aspects are typically managed by HIMs) represent and model both

medical work and the record itself through co-ordination of clinical activities and the accumulation of inscriptions.

When observed through the lens of Suchman's (2005) notion of an object, the record has a social life. This is evident as it progresses through and mediates the hospital's clinical and health information management techno-scientific practices and ramifies opportunities for organisational, clinical and informational translation and transformations. I contend that the production does not end at the patient's discharge, because now the HIMs appropriate the UR. In the context of the current study, I posit that the major transformation of the UR is effected in what I call the 'post-clinical' stage. Herein, the UR is re-contextualised and transitioned into the managerial environment by the HIMs as they abstract administrative, clinical, and financial data from its inscriptions.

The voices

Embedded in the authority of the dominant medical paradigm, the medical record contains the voices of its clinician-authors who constitute and represent what Poirer et al (1992) refer to as the 'omnipresent medical enterprise' (p.2). In thus representing the formal, the voice of medicine, the medical record contrasts with the patient's perspective, described by Atkinson (1997) as the 'voice of the lifeworld' (p.333). Kirkpatrick (2008) argues that as doctors reconfigure the patient's illness and problematise it as disease and medico-technical issues, the patient's voice disappears, becomes silenced. It is this problematised disease that the HIMs re-configure and code, process, and analyse. The presence, or otherwise, in the UR of a non-clinical and non-patient voice - such as the HIM voice - is absent from the literature. Arguably, the UR ultimately includes traces of voices of the HIMs who abstract the record and allocate diagnostic and casemix codes to the inscribed diagnoses and procedures. It may also reflect the voice of the state that, from distance, imposes the inclusion of specific data items, and algorithms to calculate the costs of care rendered.

The HIMs' actuarial reading

Australia's HIMs, organisationally separate from what Waitzkin (1989) describes as the physicality and intimacy of 'laying on of hands' (p.230), engage remotely with the patient via a bureaucratic encounter with his or her health information and the UR. Their reading of the medical record in

what Garfinkel and Bittner (1967) call its 'actuarial' (p.202) guise involves abstraction and decoding to elicit the real meanings of its inscriptions to provide an interpretation for research and bureaucratic purposes. Thusly, the HIMs turn the medical records into what Timmermans and Berg (2003b) describe as 'managerial instruments' (p.104).

Re-contextualising the medical record

The medical record's deep embeddedness within medical work is consistent with Berg's (1996b) portrayal of clinicians' use of the UR as 'practices of reading and writing the patient's body' (p.511). Arguably, this characterisation preludes the HIMs' re-creation and transformation of the UR's contents, post-discharge, via re-contextualisation. Re-contextualisation, according to Iedema and Wodak (1999), involves 'shifts of meaning away from their previous instantiations' (p.13). Grant and Hardy (2003) subsequently refer to 'successive phases of textualisation' (p.8) occurring when texts are disseminated among multiple users and actors. I posit that in the hands of the HIMs, the UR is re-contextualised as it progresses through various steps in the post-clinical stage. Concomitantly, the patient – embodied in the UR - becomes distanced from the circumstances of his or her production into patienthood. Once extracted from the original context, the data automatically achieve factuality through being standardised as 'equally hard "facts"' (Berg et al 1998a, p.246). It will be seen in the empirical findings of this study that the HIMs extricate these "facts" to establish the (re-)constructed "truth" of the patient. Systematically interpreted by the HIMs, the "facts" are used for myriad secondary applications within and beyond the treating healthcare facility.

As a collective of core health information, the record becomes a 're-enactment' (Berg 1996b, p.520). It constitutes a form of organisational memory (Baker and Bowker 2007) of the activities, decisions and outcomes of the patient's care, thus producing what Berg and Bowker (1997) term the 'body politic' (p.514). The UR thus is a key player in the performance of the healthcare facility, and becomes a complex organisational infrastructure (Berg and Bowker 1997). As a boundary object, it connects patient, organisation, clinicians, other institutions, and individuals including the HIMs who work with it; ultimately, it affords what Berg and Bowker (1997) describe as 'the interplay and coordination of divergent worlds' (p.513).

The immutable medical record

The record is, per Latour's (1986) theory of immutable mobiles, immutable. This status concerns replicability and is achieved by creating identical copies, whereas mobility refers to 'the number of copies' (p.11) which implicitly enables connections between places in time and space. Latour (1986) and Star (1995b) observe that subject to trade-offs between mutability and immutability, over time and in changing work situations, mobiles are subject to re-representation. We are alert to the fact that this presents risk because it does not preclude proliferation of 'adulterated' (Latour 1986, p.11) documents, a situation that HIMs must prevent as this would distort the source of "truth".

The paper-based medical record

Paper documents (and here we consider components of the UR in many Australian hospitals) are in very valuable in structuring both information and society (Brown and Duguid 2000). As artefacts, paper medical records are more than containers of information: they possess what Heath and Luff (1996) and Tange (1995) identify as resilience and ecological flexibility. Lacking the mobility of EHRs, these advantages, and portability and localness, afford them a 'micro-mobility' (Luff and Heath 1998, p.306) that enables synchronous and asynchronous collaborative clinical work (Harper et al 1997).

Digital (scanned) medical records

The digitisation of paper medical records, undertaken by HIMs' staff using sophisticated scanning software, is often an interim, but not contiguous, step in the progression from paper to EHRs. Scanning technology offers an electronic storage solution, immutability, and synchronous user access, i.e. what Latour (1986) terms mobility. Problematically, it produces inert online files and leads to hybrid systems (Greenberg and Grzybowski 2007; Buchanan and Alexiou 2011). Digitisation can also present challenges in terms of cost, efficiency, and adverse impacts on clinicians' work practices (Lærum, Karlsen and Faxvaag 2003; Lium and Faxvaag 2006; Lium et al 2006).

Electronic health records

Internationally, the significant impetus for the earlier EHRs was propelled initially by largely non-clinical secondary users including 'hospital management, governments, insurance agencies, researchers' (Berg et al 1998, p.244) who sought easily accessible data. Timmermans and Berg

(2003a) observe the EHR to be the next major change in healthcare, following EBM. Sometimes called electronic medical records, EHRs are being introduced incrementally in Australia subject to time, cost, and technical and change management challenges associated with the development and implementation of robust supporting systems, as outlined by Mailes et al (2015).

Significantly, many in the American health information management field (e.g. Amatayakul 2004; American Health Information Management Association 2003; Calhoun, Rudman and Watzlaf 2012), predict that the increasing presence of EHR systems will have long-term effects on the work of HIMs, whose core functions are becoming more important. This is consistent with findings from Denmark concerning the role of the aforementioned 'medical secretaries'. Whilst medical secretaries are lesser qualified and generally undertake lower level work than Australia's HIMs, there are some commonalities (e.g. classification)²². Bertelsen and Nøhr (2005), and Bossen, Jensen and Udsen (2014) report that the secretaries' critical, behind-the-scenes articulation and information gatekeeping work at ward and department levels contributes significantly to the implementation of EHRs.

Indisputably, EHRs offer multiple clinical, research and administrative advantages; useful accounts can be found in Amatayakul (2004), Forster et al (2015), Grant et al (2006), Murphy, Hanken and Waters (1999), Murphy and Helbig (2012), and Payne et al (2010). Brodnik (2012) sees the transition from paper to EHR as intentional of arguably worthy objectives in support of patient safety, improvement of care and public health surveillance, and control of healthcare costs, but omits evidence for the latter.

Whilst many attributes of EHRs are incontrovertible it is important, for balance, to apply a critical lens. Occasionally, enthusiastic yet unsubstantiated claims of cost-effectiveness and other benefits contradict evidence of mixed outcomes; these include variable quality, failures, reversion to paper,

²² Differences between Denmark's hospital medical secretaries and Australia's HIMs include the comparative level and content of their professional education and levels of their expertise and work. The medical secretaries undertake a two-year vocational course (Bossen, Jensen and Udsen 2014) whereas the HIMs, similar to American HIMs, complete a profession-specific university degree. The medical secretaries perform 'secretarial' work (e.g. transcription and clerical work including support to clinicians) not undertaken by Australia's HIMs. The HIMs manage systems, and clerical and secretarial staff, and focus on interpretive, analytical, research, and ICT work a healthcare system-wide environment.

risks to patient safety and information governance, and major socio-technical issues for clinicians²³. Berg (1999a), Høstgaard, Bertelsen and Nøhr (2011), Monteiro et al (2013), Garrety, McLoughlin and Zelle (2014), Garrety et al (2014), and Wilson, Baines and McLoughlin (2014), amongst others, report failures associated with the technological and social complexities of large-scale health IT systems. Suchman (2012) problematises aspirational EHR systems that are ‘all things to all users’ (p.51), observing that they require configuration and negotiation. In critiquing the ICT world’s utopian views of EHRs, Berg (2002) maintains that the EHR is documented for the purpose of the care process. He sees as problematic the notion that it stores masses of ‘data-treasure’ amenable to standardised terminologies and data mining; indeed, he asserts, it often ‘yields “garbage”’ (p.36). This is reminiscent of Tsoukas’ (1997) aforementioned concerns about the potential for excessive and unused data in bureaucratic systems, and consistent with Cimino’s (2013) caution that EHRs can contain too many extraneous details whose volume can mask important facts.

No health information systems, including EHRs, are perfect, coherent, seamless technologies. In reality, EHRs are complex assortments of different components and systems reflective of Suchman et al’s (1999) ‘array of partial heterogeneous devices brought together [in different assemblages] on particular occasions of work’ (p.399). It will become evident in Chapters 5, 6 and 7 that the HIMs constantly repair ‘the cracks and fissures’ (Gasser, cited in Berg 1998b, p.468) in the border zone between the ‘realms of technology’ and ‘human work’ (p.457-8).

Databases

Databases are central to the HIMs’ world. In heroising the database as ‘the cultural and technological object of our times’ (p.128), Baker and Bowker (2007) contend that it ‘never stands alone’ (p.128) because the multiple containers for organisational memory interoperate. This does not reference the technical concept of computer system interoperability; rather, in this context interoperating can be seen to resonate more with Hutchins’ (1995) theory of distributed cognition, introduced in Chapter 2, which allows for the lived experience of an ecology of memory traces as distinct from memory ‘held in a file cabinet’ (Baker and Bowker 2007, p.129).

²³ Useful accounts can be found in Berg (1999b), Coiera (2004; 2015), Harrison, Koppel and Bar-Lev (2007), Payne et al (2010), Black et al (2011), Bleich and Slack (2011), and Greenhalgh et al (2011).

The PAS, a critical boundary object, is the underpinning component of the composite of systems often described in the health informatics literature as the Patient Care Information System which contains ‘all those systems ... primarily oriented at the support of [clinicians’] tasks’, i.e. excepting the non-patient related systems (Berg 1999b, 2001, 2004; Ash, Berg and Coiera 2004). In Australia, the PAS can be a stand-alone system (individual facility) or a network-wide Enterprise PAS (Williams, Robinson and Toth 2006; Drake and Sydes 2008). It lies typically within the ambit of the HIMs, and its components include the Patient Master Index (PMI), Disease and Operation database, and other sub-systems. Various other databases and the medical record itself may also be construed as ecological databases within the reach of Baker and Bowker’s (2007) description. Some are held long-term and others permanently; their durability enables repeated use of the data in identified or de-identified form at local, community, and global levels. In a point of departure from Baker and Bowker’s model, Australia’s medical records and health databases endure well after the data creators (clinicians) and collectors (HIMs) move on, but changes occur in the enabling technologies.

In anticipation of discussions on the classification and reporting of health data, we divert briefly to identify some core standards in the contemporary health information ecology.

Standards in practice: bringing order from disorder

We recall from Chapter 2 that standardisation is one of the defining features of health information management and that the centrality of written documentation, and its management and inherent standardisation, are critical elements of bureaucracy. Furthermore, Lash (2002) observes that inclusion in the 21st century’s global information order demands ‘[c]urrency with and adherence to standards’ (p.198). Standardisation and multiple standards are essential to and ubiquitous in the health information ecology wherein HIMs constantly work to produce order.

The constitution of universalities can usefully be applied, specifically Berg and Timmermans’ (2000) concept of the creation of a universal order which reflects an ever-present tension between disorder and order. For example, according to O’Connell (1993), the development of a universal, standard, scientific object or technology involving metrological practices is inherently complex and intense. Importantly, ‘universal’ (Berg and Timmermans 2000, p.31) standards effect order and,

simultaneously, erase local practices and procedures, transforming disorderliness into a universal order. Inherently political, this re-ordering and re-configuring of practices, patients, things, and clinical work establishes 'new notions of autonomy, objectivity, medical jurisdiction, and risk' (Timmermans and Berg 2003a, p.viii). The HIMs' myriad standards, practices, and processes have been developed or adopted over time, and negotiated within what Alder (1998) describes as 'a wider process of social struggle' (p.504). Rationalising the HIMs' work and rendering it more efficient, standards assist them to order and stabilise medical records, health data, and information. Timmermans and Berg identify four main categories of standards. Here, I identify only applications in the realm of the health information management ecology: design standards establish 'structural specifications' (p.24) for medical record and form design, health ICTs, and data; terminological standards include classifications²⁴; performance standards include Key Performance Indicators (KPI), accreditation standards, Clinical Indicators (CI), and the like; and procedural standards delineate workplace processes. Various standards are shown in [Appendix 2](#). As standards and classifications are related as 'two sides of the same coin' (Bowker and Star 1999, p.15), we now introduce classification, an important component of HIMs' re-contextualisation work.

Theory and practice of classification

[C]lassification systems and standards ... [are] ... artifacts embodying moral and aesthetic choices that in turn craft people's identities, aspirations, and dignity

(Bowker and Star 1999, p.4).

It is posited here that HIMs create order through the classification: they re-constitute and summarise the narrative and mess of the medical record and, simultaneously, discipline the patient's body. Following rational medicine, classification work also mirrors medical diagnosis and therapeutic practices through the codes. Significantly, according to Berg and Timmermans (2000), whilst creating classificatory order from the disorder of the medical records and differently labelled diagnoses and operative procedures, this creation of the universal order 'produces its own wildness' (p.36). In other words, what is 'wild' is 'coproduced with the emergence of the "order"' (p.36) which 'performs its own disorder' and also 'always contains it' (p.36). This is synergistic with Latour's (1988) theory that order 'is extracted not from disorder but from orders' (p.161).

²⁴ A significant component of standards within the health information ecology attaches to the ICD-10-AM classification and its cohort of constantly renewed standards and rules: they simultaneously discipline, and make more scientific, HIMs' work.

A *classification* can be defined as ‘a spatial, temporal, or spatio-temporal segmentation of the world’ (Bowker and Star 1999, p.10), and a *classification system* as a metaphorical or literal ‘set of boxes ... into which things can be put to then do some kind of work – bureaucratic or knowledge production’ (p.10). Bowker and Star (1999) identify the properties of a classification: consistent, unique classificatory principles; mutually exclusive categories; and completeness. The last characteristic denotes an ideal classification that provides ‘total coverage of the world it describes’ (p.11), inevitably presenting a challenge for HIM-Coders when a new disease or heretofore unclassified surgical procedure is documented in a medical record (refer Case Study 3, Chapter 7).

A boundary infrastructure

Classifications provide both ‘a living organizational memory and a means for bureaucratic control’ (Timmermans, Bowker and Star 1998, p.122). The extant health classification used in Australian hospitals is a constantly evolving technology that is central to HIMs’ work. The *International Classification of Diseases* (ICD), used globally, is a product of the World Health Organization (WHO) and its iterations are developed by the WHO (Rust 2010). Australia’s comprehensive, complex modification of the ICD is the ICD-10-AM²⁵; this five-volume classification includes diseases, interventions, and the Australian Coding Standards (ACS). The ICD-10-AM and AR-DRG classifications are mandated by government for use in acute care facilities²⁶. The ICD-10-AM serves ‘multiple communities of practice’ (Bowker and Star 1999, p.313) as it simultaneously spans and connects government, researchers, the National Classification Institute (NCI)²⁷, Australia’s national Independent Hospital Pricing Authority, and the HIMs and their hospitals in the morbidity and mortality data research, and financial, arenas. In this sense it fits Bowker and Star’s (1999)

²⁵ *The International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification* (ICD-10-AM) comprises:

- Australian Classification of Health Interventions (ACHI) alphabetic index of interventions
- ACHI Tabular List of Interventions
- ICD-10-AM Alphabetic Index of Diseases
- ICD-10-AM Tabular List of Diseases
- Australian Coding Standards for ICD-10-AM and ACHI.

²⁶ Many other classifications are also used by HIMs in different parts of the healthcare system, as reported in Chapter 5 by participants in this study. Further classifications are under assessment for future use, such as, according to Madden and Dimitropoulos (2014), *The International Classification of Functioning, Disability and Health* (ICF).

²⁷ A pseudonym.

description of a boundary infrastructure. Furthermore, the ICD-10-AM exhibits the characteristics of a large-scale information infrastructure, as defined by Star and Ruhleder (1996), Bowker and Star (1999), and Star and Bowker (1995). As the generic ICD and its supporting practices and products are considered by Bowker and Star (1999) to be integral to the 'built information environment' (p.5), we deduce that likewise, the ICD-10-AM and its standards and products are part of the built environment of Australia's health information ecology and the healthcare system²⁸. Invisibilising the work that creates, supports, surrounds and manages it, the ICD – and we interpose ICD-10-AM – is, according to Star (1999), 'part of the background for other kinds of work' (p.380). Here, we reference ABF, research, health service planning, healthcare quality management, and multiple other functions reliant upon coded data.

Theoretical underpinning

We recall that Durkheim and Mauss's (1963; Durkheim 1995) theories of classification, including the concepts of the sacred and the profane, underpin contemporary classifications. So, too, does Douglas' (1966) appropriation of the body as a classificatory system.

The ICD-10-AM's Tabular List of Diseases explains the aim of health classification as 'To translate medical statements into code' (Independent Hospital Pricing Authority and Australian Consortium for Classification Development 2015, p.5). After doctors problematise the patient's body via diagnostic labels, the HIMs reconstruct it through multiple abstraction, classificatory and analytical processes. They thusly undertake 'due process' (Star 1995b, p.90; Gerson and Star 1986) by representing patients through a complex series of judgements, supported by standards-based rules and procedures. Sometimes, residual categories are required for diseases that are marginal and neither classifiable nor formally representable within the classification system (Bowker and Star 1999; Star and Bowker 2007). A double silencing eventuates when items are assigned to residual or pooled categories: the diseases or procedures (and, therefore, the cases) are difficult to retrieve from the disease index (database). Bowker (2000) reminds us that whatever misses being classified becomes or remains invisible.

²⁸ The ICD-10-AM is also used in several other countries, e.g. Ireland, Singapore, and Saudi Arabia.

The social construction of classification

As infrastructures, classifications are distinguishable from the actors – and we interpose HIMs - who do the ‘infrastructuring’ work (Bowker and Star 1999). Armstrong (2011) reinforces the notion that the ICD enables and formalises Foucault’s nosology and remains linked to and structurally reflective of his pathological system of medicine. Bowker and Star (1999) advocate flexible classifications ‘whose users are aware of the political and organisational dimensions and which explicitly retain traces of their construction’ (p.326). These notions have pertinency to the work of the HIMs in this study.

In their comprehensive analysis of classifications, Bowker and Star (1999) explore the ‘invisible’ work that creates and supports these infrastructures: this seemingly effortless classificatory work, they postulate, is complex and undervalued. Of import to HIMs is Bowker and Star’s (1999) observation that the dual absence of visibility and recognition reflects the post-modern assumption that this behind-the-scenes production work is unworthy of consideration. Furthermore, this reminds us that the classification itself has further reach: it can construct the formal disease and operation indices that form the basis of research, and internal and external reports for multiple internal users and external stakeholders.

A moral imperative for visibility

The creation, scaffolding and maintenance of classification systems and standards is imbued with multiple and multi-layered political, ethical, and epistemological decisions. For Durkheim and Mauss (1963), classifications ‘express ... the very societies within which they were elaborated’ (p.66). This invisible classificatory work, observe Bowker and Star (1999), asserts a compelling moral imperative. Whilst there are many examples in the clinical world of ordering, documenting and representing the human body to render it ‘legible’ to clinicians or to construct and refine new diseases (e.g. Latimer et al 2006; White 2008), we are conscious of the fact that bodies are inscribed into the health information management ecology by bureaucratic, ordering, and risk minimisation processes including record and system management, classification, and auditing.

Classification in practice

Australian health classification practice²⁹ requires the HIM-Coder to abstract the (clinical and demographic facts of the) patient from the UR, interpret these and the findings and frame, order, and communicate diagnoses and interventions via the dedicated language of the structured classification system. This, in turn, is governed by complex standards and rules (Price and Robinson 2011). Indeed, formalised rules govern virtually every aspect of HIMs' classificatory work:

[t]he translation of disease, injury, condition and procedure descriptions into code is a complex activity. Because coding is used in so many areas, it is essential that coding is performed correctly and consistently in order to produce meaningful statistics to aid in the planning of the health care needs of the country (Independent Hospital Pricing Authority and Australian Consortium for Classification Development 2015 [ICD-10-AM Tabular List of Diseases p.5]).

The ICD, exemplified by Bowker and Star (1999) as a key, global infrastructural component of medical and epidemiological 'software' (p.135), has a long-term relevance sustained through multiple revisions and rules established to reflect developments in clinical knowledge and practice. This resonates with Australia's HIMs, who regularly accommodate new editions of the classification, and interpret and deal constantly with changes to the ACS and new directives and guidelines from state Departments of Health and funding authorities (as seen in the State-wide ICD Coding Committee's work, described in Chapter 7). The dynamic ICD-10-AM undergoes constant change and updating. The retrieval and forward-mapping of data originally coded in versions, classifications and systems no longer used in Australia also necessitate the HIMs' translation of these for longitudinal research studies³⁰.

Automated classification

It is timely to mention the somewhat plodding move to automated classification. The technical challenges include the development of clinical terminologies allowing the embedding of classification systems in a fully functioning EHR to enable clinicians' natural medical language, inscribed in the UR, to be applied automatically to a reference terminology via an interface

²⁹ Colloquially termed clinical coding or coding.

³⁰ These classifications include but are not limited to the: *Hospital Adaptation of the International Classification of Diseases*; *Code of Surgical Operations*; *International Classification of Diseases, Ninth Edition, Clinical Modification*; *International Classification of Diseases, Eighth Edition*; *Standard Nomenclature of Diseases and Operations*; *Systematized Nomenclature of Pathology*; and others.

terminology (Johns and Ludwig 2002; Scott 2002; Abrams et al 2015). Significant dependencies on accurate classification, and the multiple uses of coded data, need to be accommodated.

The notion of the HIMs' 'classificatory gaze'

It is timely to pause to consider the HIMs' surveillance of the human body, through abstraction and classification, thereby enabling the rationalisation (and managerialisation) of healthcare and the power of the state. Of relevance is O'Neill's (1986) observation that the human body is 'the ultimate text upon which the power of the state and the economy is inscribed' (p.45). Increased risk to population health, asserts Turner (1997), demands more quality control, intensive government surveillance, and the imposition of rationalist managerialism in healthcare. An analogy with Foucault's (1973) medical gaze, alluded to in Chapter 1, suggests that HIMs arguably exert what Prasad (2005) terms a 'bi-focal gaze' (p.292) similar to the radiological gaze whereby radiologists abstract the patient from digital images. The HIMs read and abstract the patient from the medical record and report their data to the state. Their interpretative process involves reconfiguring, redefining and notating the patient according to mutually exclusive codes, each holding specific meaning. The HIM does not see the patient's body in the sense of the Foucaultian clinical gaze. Instead, what I will term the 'classificatory gaze' involves reading and interpreting words and allocating codes to their meanings. The classification provides a directory of the patient's body, its diseases, and the performed operative procedures. The different categories of ICD-10-AM codes, precedents, ACS, DRGs, and decisions of State-wide ICD Coding Committees and the NCI, directly inform the HIMs' decisions.

Following their classification and other post-discharge work on the UR, the HIMs undertake further actuarial work through auditing and other quality-focused activities. These may be seen to reflect the risk society introduced in Chapter 2.

Auditing and quality activities in the risk society

Quality management in healthcare is information-based, requiring organisational investment in effective clinical and administrative information systems (Wilson and Goldschmidt 1995). It is not possible for hospitals to undertake reliable benchmarking, sustain a credible quality management or clinical governance program, or achieve accreditation status without what Timmermans and

Berg (2003a) describe as ‘proper’ (p.197) coding of data, proper clinical reporting practice, and technologically-enabled health information availability. High quality, complete clinical and administrative UR documentation is pre-requisite to classifying, and is described by the National Centre for Classification in Health (2003), Price and Robinson (2011) and Chin et al (2013) as underpinning the quality of the coded data and their utility for financial reimbursement.

Since the inception of quality assurance in healthcare following Donabedian’s (1966, 1969, 1973, 1980, 1982, 1988, 2003) lead in the 1960s and subsequently, and compliant with hospital accreditation requirements, HIMs have engaged in quality-related activities including audits. These are directed to ensuring the completeness and integrity of medical records, health information, coded data, and clinically-related outcomes (Miller, Elliott and Grant 1981; Medical Record Association of Australia 1989; Lapsley 2000). From the outset, healthcare quality assurance included standards and adhered to the concepts of efficiency and effectiveness (e.g. Myers 1965; Donabedian 1969). These are reflected in contemporary Australian approaches that have shepherded progression from the dominant paradigm of quality assurance to quality management, clinical governance, and resilient health care³¹. An emerging relationship between the Australian HIMs’ classification and the measurement of quality or appropriateness of care is seen in the increasing use of coded data to identify complications, adverse events, and ineffective or unnecessary treatments (e.g. Eshani, Jackson and Duckett 2006; Jackson, Duckett, Shepherd and Baxter 2006; Moje, Jackson and Street 2006; Utz, Johnston and Halech 2012; Duckett and Breadon 2015).

Auditing of classificatory practice and coded data

The previously mentioned routine internal auditing of the HIM-Coders’ outputs, particularly ICD-10-AM codes and DRGs, and of clinicians’ medical record documentation, is another key quality (and risk) management tool used by HIMs. Cheng et al (2009) and Uzkuraitis, Hastings and Torney (2010) explain the purpose of coding and DRG audits as optimising revenues within legal limits, an approach consonant with Scrivens’ (2005) notion that auditing is associated with ‘stewardship of resources’ (p.128). Such auditing practice in hospitals can be interpreted to represent more than

³¹ Useful local accounts are found in Ell and Ell (1991), Wilson and Goldschmidt (1995), Balding (2004, 2005, 2008, 2011), Wolff and Taylor (2009) and Hollnagel, Wears and Braithwaite (2015).

simply ‘a technical response’ (Power 1994, p.5) to governance and accountability problems; rather, it is a means of articulating values and rationalising mechanisms of social control. This is synergistic with what Power calls the ‘explosion of audits’ (p.47) which began in the 1980s – including in healthcare - and was driven by changes in governance mechanisms and the need to process risk. Audits, according to Power, are a way of addressing risk. Whilst audits and similar processes, according to Emmerich (2013), are a ‘performed transparency’ (p.183), they are not necessarily ethically accountable. They may, in fact, have the opposite effect and should be reviewed reflexively to maintain their relevance (Emmerich et al 2015). Offering a contra-argument, Power (1997) observes that auditing is a cost-effective means of achieving ‘incremental assurance about a wide range of activities’ (p.143).

Once the medical record content, and coded and other data, are audited to confirm that they represent the “truth”, the HIMs engage in the next step of their actuarial and transformation work. This concerns the retrieval, analysis and reporting of data via constructed, mediated boundary objects which become sanitised as official versions.

The praxis – data retrieval, analysis, and reporting

Behind the statistics lie countless individual and collective dramas that profoundly affect lives

(Timmermans 2013, p.3).

At this juncture and in the context of HIMs’ data retrieval, analysis and reporting internally and to state authorities, it is timely to consider Smith’s theory as a framework for their translation work.

Smith’s relations of ruling

Foreshadowed in Chapter 1, Smith’s (1990b) theory explicates the textually-mediated versions of healthcare and its outcomes, constituent of what she calls ‘the relations of ruling’ (p.6). Smith exemplifies the mediation and transposition of personal events (e.g. suicide) into an ‘objectified set of records’ (p.146) that transfer the local into the official, state-sanctioned versions, demonstrating:

... [an] invisible but deep dependence on the bureaucratic, professional, and other forms of formal organization and organizational practices that bring phenomena into being in their relations to an everyday world they organize and regulate (p.145).

Smith describes the ‘professional and administrative organization of work’ (p.145) that is integral to the organisation and functioning of the state and its ‘apparatuses of ruling’ (p.146). This work methodically accounts for, describes, categorises and transforms ‘what actually happened’ (p.146) at the level of the individual, and then provides the official interpretation, data and statistics. The language used to re-describe and categorise events becomes part of the ‘institutional form of ruling mediated by documentary forms of knowledge’ (p.144). A powerful analogy can be drawn with the work of HIMs, such as in their transforming and subsequent reporting of (re-)constructed, mediated data to governments and other bodies.

This secondary work is undertaken by ‘an intelligentsia, organized in discursive relations, reflecting on, systematizing, and generalizing from information constructed in multiple local sites’ (p.145). This makes sense of the administrative work that produces ‘organizational forms of [contextual] knowledge’ (p.145) within the technological environment. The world of the intelligentsia, Smith asserts, is dependent upon the accuracy and relevance of transforming and translating practices. It is the HIMs who undertake the further (and essential) secondary work with health information, at the stage beyond their initial data extraction, classification and analysis.

Data infrastructuring of policy, planning and service delivery

Data quality, according to the International Standards Organization (2011), is essentially the degree to which data are fit-for-purpose. Data quality also becomes more important with increasing re-use in contemporary scientific work (Baker and Bowker 2007). In Australia, demand has exacerbated over the past quarter-century for ‘reliable, timely, and accurate’ (Australian Institute of Health and Welfare 2014, p.vii) population-level health information and statistics. This necessitates the systematic collection of mandated data items, and their retrieval, analysis and reporting to state, territory, and national governments and statutory bodies. Data quality, including in clinical databases, is of concern to HIMs throughout the healthcare system: for example, O’Farrell (2014), Palma (2014) and Sullivan (2014) observe that critical factors include timeliness of the data collection, structuring and formatting of the collection systems, compliance with standards and protocols, and quality assurance mechanisms. In addition to their other applications in population health, research, epidemiology and health service funding, many forms of data produced by HIMs are essential to inform health service and capacity forecasting and planning, and for benchmarking

in 'primary and community care, rehabilitation, sub-acute and long term and residential care' (Leggat 2008, p.11). A significant component of this aspect of HIMs' work is driven by legislation, and government policy, guidelines and directives. Some examples are now offered.

Health data reporting

The intense, data-related engagement of HIMs is reflected in the practice literature. Those employed in the government sectors undertake population and health services data analysis and governance, database management and reform, epidemiology, and standards development and monitoring (e.g. Perry 2013). The state and territory legislation governing health information lacks uniformity; for instance, there are public and private sector differences in mandatory requirements for some health data collections and for reporting (Riley 2005; McKenzie et al 2010). Certain data items must be reported to governments, epidemiological bodies, registers, health insurance funds, and statutory organisations including state-based Cancer Councils. This data retrieval, analysis and reporting is typically undertaken by HIMs, whilst other HIMs are employed in some of the receiving agencies and undertake the next stages including interpretation, analysis, and application of aggregated data.

The HIMs employed in the private hospital and health insurance sectors, for example, must observe legislation³² and attendant business rules which mandate private hospital submission of standardised data to state and other authorities (Predl 2014). Australian private hospital data are:

... collected, analysed and disseminated through multiple recording pathways including the Australian Bureau of Statistics' Private Health Establishments Collection, the Australian Government Department of Health's Private Hospital Data Bureau and the Hospital Casemix Protocol, and the AIHW's National Hospital Morbidity Database (Australian Institute of Health and Welfare 2014, p.423).

The data reported to the national Private Hospitals Data Bureau include patients' demographic and hospital episodic details³³; de-identified, they are subsequently widely-used (by others, including

³² For example: *Private Health Insurance Act 2007* (Commonwealth); *National Health Act 1953* (Commonwealth).

³³ These include coded diagnoses and procedures, costs, and admission and separation dates.

HIMs) in other statutory reporting, hospital benchmarking, hospital-insurance fund negotiations, resource usage analysis, and case complexity weighting (Predl 2010, 2014; Szakiel 2010)³⁴.

In light of the HIMs' extensive de-contextualisation and translation work on patients' personal, confidential health data, it is apposite to conclude this chapter with reference to the underpinning ethical practice that provides a metaphorical cornerstone for their trustworthy role.

A trustworthy role

Congruent with the 21st century Australian HIMs' formalised values and ethics (Health Information Management Association of Australia 2015) are Huffman's (1963) words from half a century ago: 'The medical record librarian holds a position of special trust in the hospital and therefore must be a person of great integrity' (p.133). Trust, according to Giddens (1991), presumes an irreducible quality of 'faith' (p.19). Confidentiality and its counterpoint, disclosure, are key dimensions of trust. They are underpinned by a cogent bioethical³⁵ argument for confidentiality of health information (Mechanic 1998; Clark and McGhee 2008; Beauchamp and Childress 2013; Kerridge, Lowe and Stewart 2013). The issue of trust for HIMs differs from that associated with the intimacy of the body work undertaken by clinicians and described by Cohen (2001), Brown et al (2011) and Twigg et al (2011). Instead, it involves far-reaching and complex health information management, legal, ethical, technological, and social factors. For instance, trust constantly comes into play in HIMs' decisions concerning: retention and destruction of medical records; protection and reporting of health information; and the design and management of paper and electronic medical records (e.g. McSherry 2004a, 2004b; Coiera and Clarke 2004; Paterson 2004; Norheim 2006; Kerridge, Lowe and Stewart 2013). The surrounding issues are integral to the HIMs' trustworthy role as: custodians of health information; bureaucratic translators of patients into codes and dollars; and managers of organisation-wide privacy, and information access.

³⁴ Private hospital HIMs must also provide standardised data, via the national Hospital Casemix Protocol, to registered private health insurance organisations according to the terms of patients' insurance arrangements.

³⁵ This includes the bioethical principle of confidentiality (and implied requirements of the other bioethical principles). Separately, these are reinforced by statutes (and principles and regulations) governing privacy and confidentiality.

Chapter summary

This chapter began by exploring the health information management ecology, the notion of HIMs as metaphorical keystone species, and the problematic of invisibility. It was suggested that this ecology envelops Baker and Bowker's (2007) conceptual framework of data, knowledge and information. This, in turn, incorporates boundary objects and infrastructures. These include the UR and its associated databases as a central artefact possessive of multiple guises, functions, and versions of mobility and immutability. The HIMs' actuarial reading of the post-clinical medical record, and their (and the record's) transforming and factualising of the patient-subject were discussed in the contexts of the relevant literatures. The HIMs' inherently trustworthy role was considered in relation to their professional work.

Some important theories explained: the power of HIMs as health information experts, truth-seekers, and creators and controllers of bureaucratic health data; and the HIMs' specialised transforming work in socially constructing disease, converting data into information and thence to knowledge and formally-sanctioned reports, and in bringing the UR to life within the health information ecology. The centrality of standards to health information science and practice was revisited. The theory and practice of classification were introduced, as were the concepts of social construction of diagnosis, and of classification, the latter exercised through what I have termed the HIMs' 'classificatory gaze'. Harking back to Beck's risk society, the chapter also addressed the HIMs' management of risk, as exercised through auditing and quality-related activities. Finally, their accountabilities in the contexts of the praxis of data collection, retrieval, analysis, and reporting were considered. Underlying all of these are notions of ordering, translating and transforming work that produces formally sanctioned data, boundary objects and boundary infrastructures and infrastructuring within the health information ecology. In the next chapter, I describe the methodology and methods applied in the current research.

Chapter 4

Methodology and methods

Introduction

The methodology that underpins this original research, and the methods used to address the research questions, are described in this chapter.

The research questions revisited

The overarching objective of this research, namely to achieve an understanding of the previously unexplored topic of health information management in Australia, raised the following research questions:

1. What are the key societal and political influences and drivers that have shaped contemporary Australian health information management?
2. What are the implications for Australian HIMs, for the shape of health information to be managed, of evolving organisational arrangements within the healthcare system?

A program of empirical work was designed to address these questions. This included a review of the health information management literatures at the 'local' practice level and at a more conceptual, theoretical level to provide context for the research. These were presented in Chapters 2 and 3. The data collection was multi-part and included in-depth interviews conducted with a cohort of HIMs situated in health information-related workplaces across the Australian healthcare system. The findings are presented in Chapter 5. Chapter 6 reveals the findings of a case study of the work of the HIMs in the environment of direct-care provision, specifically in an AHN within a state capital city. Two smaller case studies explored specialist areas of HIMs' professional work in classificatory decision-making and health information system implementation, respectively. These findings are reported in Chapter 7.

Smith (1990a) observes that '[t]he only way of knowing a socially constructed world is knowing it from within. We can never stand outside it' (p.22). In researching and writing this thesis, I have been informed by my professional experiences as a practicing Health Information Manager and educator of student HIMs. I acknowledge that, inevitably, there are biases in my thinking that derive from my experiences as practitioner and consultant in my professional field and the related area of healthcare quality management, as a member of committees of health-related

organisations and the professional association, and as an academic and head of one of the few university health information management programs in Australasia. In the latter position, and as a past editor of the national professional journal I have been, effectively, an informal leader of the profession. Whilst thusly 'knowing' health information management from within, I also have had the privilege of positioning myself as researcher to stand apart and explore the workings of the profession of health information management in Australia.

I begin by describing the methodological framework. I then explain the methods that were applied in the research.

The methodological framework

The interpretive frame

In seeking to explore and understand the meanings ascribed by Australian HIMs to their professional work, I used qualitative methodological inquiry informed by an interpretive framework of social constructivism as described by Creswell (2009).

The constructivist approach

The constructivist approach assumes that individuals develop subjective and multiple meanings of their experiences. Essentially, they 'construct the realities in which they participate' (Charmaz 2006, p.187). This involves a focus by the researcher on the participants' perceptions, descriptions and constructed explanations of their beliefs, experiences and activities (Berger and Luckman 1967; Creswell 2009; Koro-Ljungberg, et al. 2013; Mertens, 2009; Silverman 2013). I adopted this methodological positioning, as outlined by authorities including Angen (2000), Charmaz (2006), Finlay (2006), Furlong (2013), and Gerring (2007), in order ultimately to achieve a deep understanding of the HIMs' negotiated meanings, perceptions and interpretations of their health information managing. This involved using an inductive style to generate what Creswell (2009) describes as 'a theory or pattern of meanings' (p.4) of the HIMs' work.

This methodological framework facilitated my understanding of the realities of the HIMs' work within its complex environments of ever-increasing technologisation, standardisation, involvements

of governments and consumers, and intensifying applications of health information to organisational funding and efficiencies, patient safety, and myriad other purposes (Denzin and Lincoln 2003). It also demanded a sense of equity; hence, in the manner described by Angen (2000) and Liamputtong (2009b), I heard and ascribed validity and legitimacy to all stories, voices, and experiences of the HIM participants. By adopting the artisanal analogy of a quilt maker, used by Denzin and Lincoln to illustrate the qualitative researcher's work, I was able to assemble and metaphorically stitch together the HIMs' experiences, actions and interpretations as a mosaic or 'pieced-together set of representations that are fitted to the specifics of a complex situation' (Denzin and Lincoln 2003, p.5). In thus seeing the HIMs' world I was able to elicit and construct the hitherto unheard voice(s) of this small and relatively hidden profession.

A reflection

The qualitative approach to inquiry situated me as an ethnographic observer in the HIMs' world (Denzin and Lincoln 2003). As researcher and HIM academic within the health information management domain, I was a professional colleague of the participants, although many had not been known to me previously. These connections were beneficial in providing me the opportunity to research the HIMs' work.

The constructivist approach recognised that my background, as researcher, informed and shaped my sense-making of the participants' experiences and stories (Creswell 2009). I was alert to the presence of my own biography and perspectives: the ubiquitous fluidity in the researcher-participant relationship meant that these factors inevitably affected the participants in ways that I 'did not (and could not) see' (Bishop and Shepherd 2011, p.1284). My own interpretations, therefore, also constituted a social construction (Charmaz 2006; Liamputtong 2009b). I was cognisant of the fact that I inadvertently but inevitably filtered my own socially situated interests, observations and assumptions (Denzin and Lincoln 2003).

This research, therefore, did not and could not yield a final proof; rather, the underpinning methodological approach enabled acknowledgement of the HIMs' mediated knowledges and perspectives of their health information managing, and my own socially constructed interpretations of these (Guba and Lincoln 1994).

Ethical considerations

Ethics Committee approval

Ethics approval for the research was obtained from the University of Technology Sydney's (UTS) Human Research Ethics Committee.

The Medical and Community Human Research Ethics Advisory Panel of the University of New South Wales granted ethics approval for the initial phase of the research: Reference Number 067076. Following transfer of my enrolment to the UTS, this approval was ratified and extended by the UTS Human Research Ethics Committee: Reference Number 2007-177R. Upon later transfer to the University of Tasmania, all ethics requirements including data collection had been completed, thus exempting me from the requirement to obtain any further ethics approval.

Timeframe

The fieldwork for this research was conducted throughout Australia in all states and territories, excepting only the Northern Territory, from August 2008 to August 2012.

Participants' consent

Initial explanation

In undertaking this research, I was cognisant of being privileged as a 'guest in the private spaces' (Stake 2003, p.154) of each participant's world. I provided each with full information about the nature of the research to enable his or her informed consent (Liamputtong 2009b). An oral (and/or emailed) explanation was given at the point when I invited participation.

Consent for in-depth interview

An information letter ([Appendix 3](#)) and the consent form were then sent to each potential participant in the Australia-wide cohort and in Case Studies 1 and 3, when he or she agreed to be interviewed. The signed consent form was given to me prior to each interview. An explanation about the project was reiterated immediately before each interview, when I also asked for and responded to any further questions about the nature and conduct of the research.

Consent for ethnographic observation

In Case Studies 2 and 3, I provided the information letter ([Appendix 3](#)) and consent form to the members to peruse prior to the forthcoming meetings. Participants were reminded of the research and of my presence at the start of the meetings and periods of participant observation. The optionality of participation was conveyed and participants were explicitly advised that this was an entirely individual decision that bore no relationship to the workings of the committee (Case Study 2), or to the system implementation (Case Study 3). The completed consent forms were returned to me prior to the meetings.

Issues of privacy and de-identification

In order to respect the privacy of my participants and to keep confidential their identities and those of their employer organisations, all of the names appearing in this thesis are pseudonyms, including those of the participants, healthcare facilities and healthcare network(s), statutory extracts, proprietary systems, statutory reporting systems, and major health databases.

Creating anonymity

The main ethical issue arising in this research concerned anonymity of easily identifiable participants (Bickford and Nisker 2015; Saunders, Kitzinger and Kitzinger 2015). This necessitated the omission of potentially identifying information including names of participants and research sites (Tilley and Woodthorpe 2011; Walford 2005). It has been posited that anonymity affords some benefits to the research project because it enables focus on what was said rather than who was saying it, thereby enhancing the researcher's independence and the 'impartiality of the research' (Vainio 2012, p.691).

In view of the small size of the health information management profession and the specialised nature of the participants' work, they or their workplaces could potentially have been identifiable in the thesis and subsequent publications had measures not been put in place to protect their privacy. Such a scenario references Walford's (2005) critique of the challenges associated with establishing full anonymity. Many members of the profession were known to each other personally or, in the case of some high-profile HIMs, by professional reputation. Another challenge concerned

the preservation of 'internal' (Saunders, Kitzing and Kitzing 2015, p.618) confidentiality so that participants could not identify themselves or their organisations.

These situations foregrounded an ethical tension between 'anonymity and rigorous descriptive research and reporting of findings' (Bickford and Nisker 2015, p.277); hence, as advised by Damianakis and Woodford (2012), several precautionary measures were instigated to manage these relationships.

Anonymisation of the participants

Prior to the interview transcription and field note review processes, I allocated a numerical code to each participant and thereafter used these numbers *in lieu* of names when handling documents and data. Each participant's name and number were linked only in the separate Number Register held by me, as researcher. This control device was designed to preserve the participants' anonymity by creating distance between the administrative record and the de-identified interview transcripts, field notes and analysed data. The names and workplace affiliations of the participants observed in Case Study 2 were publically available via a government website; nonetheless, for the abovementioned reasons, and consistency, I concealed their identities in this research.

In the reporting of data, the aforementioned numbers (and pseudonyms in Case Studies 1 and 3) were used.

Anonymisation of the workplaces and systems

I attached pseudonyms to participants' workplaces to mitigate the potential for breach of confidentiality in the reporting process. The names of proprietary computer systems and products might have identified some hospitals and healthcare services, such as where a specific system or product predominated in a state or territory. I therefore allocated generic descriptors to patient administration, clinical information, casemix decision-support, and other health IT systems.

The research methods

Qualitative research has the capacity to 'make conceptual generalisations from the local context(s)' (Kitto, Chesters and Grbich 2008, p.243) of the study to other settings. Congruent with my

overarching methodological framework, I deployed a range of 'interconnected interpretive methods' (Denzin and Lincoln 2003, p.31) to facilitate my investigation of the HIMs' work. To this end I adopted the qualitative research methods of in-depth interviews, case studies, and ethnographic observation (Liamputtong 2009b). I used these methods to spotlight and highlight the HIMs' work, bearing in mind Daly, Kellehear and Gliksman's (1998) engaging visual analogy:

Combining methods is a bit like shining lights of various colours on a topic, shifting from one colour to the other, but with the final analysis synthesizing the combined effect of what the different coloured lights have displayed (p.155).

I selected HIMs and organisations from throughout Australia's healthcare system to secure a range of views or to observe their work, as recommended by Charmaz (2004). This approach lent rigour to the research and enhanced credibility of the results where the different methods produced similarities in the findings (Denzin and Lincoln 2003; Liamputtong 2009b).

Triangulation

Triangulation, according to Silverman (2013), is essentially the 'attempt to get a true fix in a situation' (p.288). Described by Liamputtong (2009b) as 'the most powerful means for strengthening credibility' (p.26), it rests ultimately upon the assumption that the use of multiple research methods and/or data sources will achieve what Angen (2000) describes as 'convergent meanings about the topic' (p.384) under study. For example, the use of multiple data sources has been acknowledged by Baxter and Jack (2008) as a 'hallmark of case study research' (p.554). I adopted this approach to increase data credibility and add strength to my findings. Notwithstanding the benefits of triangulation, I acknowledge the inherent challenge in establishing the "truth" and observe that my interpretations of the data are, ultimately, my own view.

Most commonly, researchers triangulate through what Stake (2003) describes as 'redundancy of data gathering and procedural challenges to explanations' (p.148). This leads to what Liamputtong (2009b) describes as corroboration of the data and the evolving themes, and enhances internal validity. In engaging and observing the wide range of HIMs in the Australia-wide cohort and the three case studies, I was able to achieve triangulation of data, or sources, through the multiple locations or points of data collection throughout the healthcare system (Janesick 2003; Liamputtong and Ezzy 2005). The triangulation of methods and data offered a variety of lenses

through which I could view and, as advocated by several authorities including Liamputtong and Ezzy (2005), Liamputtong (2009b) and Stake (2003), develop a complex picture of the HIMs and their work.

In-depth interviews: rationale

Purpose of the interviews

My intention in using in-depth interviews was to ‘explore the insider perspective’ (Taylor 2005, p.39), thereby to gain a deep understanding of the reality of the HIMs’ overt and hidden views or ‘dimensions’ (Liamputtong 2009b, p.43), derive meaning and significance from their perspectives, stories, memories and actions, and construct theory (Boje 1991; Charmaz 2004; Conlon et.al. 2015; Marvasti 2004).

In challenging Glaser’s view that in interviews ‘people will tell you what most concerns them in the setting’ (Charmaz 2004, p.982), Charmaz asserted that this was often not the case; in other words, for many participants the really important issues are potentially unutterable. In order to enable my participants to express their views I adopted Charmaz’s (2004) approach and concentrated on learning about, rather than imposing logic upon, their experiences.

Case studies: rationale

Purpose of the case studies

The case study is a common method used in qualitative inquiry and it offered a vehicle to achieve thick description that, in turn, would underpin what Lincoln and Guba (1990) refer to as an ‘understanding of context and situation’ (p.54). I therefore adopted the case study as the mechanism for examining three discrete exempla of health information management. Different authorities offer slightly varying approaches to the qualitative case study, e.g. Yin (2014) identifies its suitability where the variables of a phenomenon cannot be differentiated from its context, and Stake (2005) sees the case as the unit of study. In following Stake’s (2003) advice, I sought out and selected case studies that represented a variety of HIM work environments. They provided me the opportunity to explore the breadth, reach, and depth of HIMs’ specialist and general professional operations in the healthcare facility direct care environment, classificatory infrastructuring, and

health informatics. They enabled me to tap individual and institutional health information-related realities and, as described by Carter and Little (2007), Eisenhardt (1989) and Stake (2003), derive deeper understandings of what it is that HIMs do.

The case studies were stand-alone. Each was a specific, bounded context in the manner described by Stake (2003), and Miles and Huberman (1984). Each constituted formal, integrated systems and definable roles, and contributed to my wider investigation of health information managing.

Collective case study

In the manner described by Stake (2003) and Baxter and Jack (2008), I extended this instrumental study of the three cases to a form of collective case study in order, concomitantly, to facilitate a better theorising in Chapter 8 of the wider issues and to derive deeper understandings of the HIMs' work.

Ethnographic observation

Purpose of participant observation

In attempting to hear and understand the HIMs' viewpoints within their social and cultural specialised work contexts, I undertook participant observation, as described by Liamputtong (2009b), in Case Studies 2 and 3. The fieldwork offered methodological and strategic benefits. These included the usefulness of ethnography in discovering grounded theory and its facilitation of my entry into, and observation of, the participants' work settings in the manner explained by Forsythe (1999) and, as described by Liamputtong (2009b) as 'an outsider with considerable inside experience' (p.130) and knowledge.

By virtue of my background I brought what Liamputtong (2009b) calls the profession-specific local language necessary to understand my participants as they worked in the sub-domains of specialist health classification and health system implementation.

The research participants

Inclusion criterion

The fundamental criterion for the selection of a 'Health Information Manager' for engagement in this research was his or her educational 'identity' as such, specifically the possession of a university-level qualification (or one of its antecedents) in health information management. This criterion neither required nor implied that the individual participant's current position title should include the term 'Health Information Manager'. The one exception was a non-HIM in Case Study 3 whose positioning, as the Executive Officer and supervisor of the team of HIMs implementing a region-wide health information system, rendered his views particularly useful in the context of these HIMs' technological and ethico-legal decision-making and actions; this is explained in Chapter 7.

Methods of recruitment: Australia-wide cohort (interviews)

In light of what Teddlie and Yu (2007) call the 'complexities of the issues being examined' (p.93), I adopted what Daly, Kellehear and Gliksman (1998, p.159) and Liamputtong (2009b, p.11) describe as a 'purposive' sampling approach using a range of techniques. I selected the research participants and the case studies as those that offered me the most to learn (Teddlie and Yu 2007). To this end, I applied what Teddlie and Yu (2007) refer to as my 'expert judgment' (p.84) as researcher, informed by my positionality as an experienced practitioner and educator in the HIM professional arena. The recruitment began with the deliberate targeting of individuals and settings that could provide critical information that was not so readily available through other approaches (Teddlie and Yu 2007).

Recruitment to the Australia-wide cohort

The cohort

The members of this cohort hailed from all states: New South Wales (NSW), Queensland, South Australia, Tasmania, Victoria, and Western Australia, as well as the Australian Capital Territory (ACT). Only the Northern Territory, owing to its very small population and correspondingly small (half-dozen) population of HIMs, was not included.

The majority of interviews involved participants from the two most populous states of NSW and Victoria which accounted for 57% (Australian Bureau of Statistics 2012) of the Australian population. They also accounted for proportionately far greater populations of HIMs than the other states and territories, individually and collectively, owing to a long-term concentration in these states of the university courses in health information management.

Purposive sampling

The HIMs in NSW and Victoria were more readily accessible for engagement in the research by virtue of physical distance and my own professional networking. Utilising my wide professional networks and contacts, and applying expert judgement, I purposively recruited interviewees from the above-mentioned jurisdictions, selecting knowledgeable people who were agreeable to interview and, also, would ostensibly constitute what Liamputtong (2009b, p.11) and Teddlie and Yu (2007, p.84) refer to as 'information-rich' cases.

Using what Liamputtong (2009b) calls the 'typical case' (p.12) sampling technique, I approached HIMs in a range of organisations in different parts of the healthcare industry, for interview. My intention was to recruit participants from the profession in order 'to achieve comparability' (Teddlie and Yu 2007, p.80) across the dimension of interest that comprised their roles and experiences in the public and private healthcare delivery environments, government health departments, statutory bodies, research and epidemiological centres, and health insurance funds, software firms and other relevant commercial organisations. In all jurisdictions, each interview was conducted with a singleton participant, except in the case of two HIMs from the same (large) facility who, when approached, requested to be interviewed as a pair. I selectively used what Liamputtong (2009b) calls the 'opportunistic' (p.14) sequential sampling technique when planning this group interview of two HIMs.

Sequential sampling techniques

My lesser familiarity with the body of HIMs in NSW largely ruled out the use of expert judgement for wide selection of participants in that state. I therefore commenced recruitment in NSW by purposively selecting two HIMs who were highly visible within the profession and known to me professionally. I then adopted what Charmaz (2006, p.15) and Liamputtong (2009b, p.14) describe

as 'sequential' sampling techniques in NSW where, once interviewed, the HIMs suggested further names. This enabled me to employ the snowball sampling technique to facilitate access to the greatest number of eligible HIMs engaged across the NSW healthcare system.

Participant representativeness and comparability were maximised through my use of what Liamputtong (2009b) describes as 'outlier' (p.12) sampling in four of the jurisdictions to recruit a small number of participants who exemplified outstanding successes in the field and who I expected would yield particularly valuable information (Teddlie and Yu 2007). The seniority or extensive experiences of these high profile individuals marked them as very successful within and beyond the profession.

Process

Progressively, I contacted potential participants via the university email system to invite them to participate in the research and, following their agreement, requested a face-to-face, in-depth interview. I then followed the consent-related process, as described above.

Methods of recruitment: case studies

Sampling: selecting the case studies

It is pertinent to acknowledge here that, in identifying and exposing particularity in a case, there is some contradiction with what Stake (2003) describes as the 'search for generalizability' (p.140). The atypicalities in my case studies did contribute to the bigger picture of the breadth of HIMs' roles and work, even if only to illustrate the complexities of health information management.

Case Study 1. Health Information Managers' work in an area health network

The Royal Healthcare Network

I undertook a case study of the HIMs' work in a metropolitan area health network, called – for the purposes of this research - The Royal Healthcare Network.

Selection of the case study and participants

The objective of this case study was to examine the work of HIMs in an exemplar organisation. Using the 'typical case' (Liamputtong 2009b, p.12) sampling technique, I purposively selected the

case of The Royal Healthcare Network from my existing wide professional networks and contacts. This network represented a complex yet broad casemix, reflected in its delivery of a very wide range, location, and level of acute care inpatient and community-based services which engaged a number of HIMs. This network had the benefit of geographical accessibility which accommodated the multiple visits required to conduct the interviews.

Once the case had been selected I employed expert judgement to recruit participants engaged in the network's health information-related functions. I knew, or was known to, many of the HIMs and primarily used my professional networks, supplemented by the snowball sampling as described by Liamputtong (2009b), to recruit a small number of the participants.

Case Study 2. Decision-making in health classification

The State-wide International Classification of Diseases (ICD) Coding Committee (SICC)

I undertook ethnographic observation of HIMs' expert work on a state government-level health classification committee. The committee was allocated the above pseudonym for the purposes of this research.

As an instrumental case study in the manner described by Stake (2003), the SICC was a coherent, bounded entity differentiated by its size, composition, and scope of work.

Selection of the case study

As the phenomenon of interest the SICC, auspiced and hosted by a state Department of Health, was purposively selected as a formal group or community that led and advised on health classification practice.

Case Study 3: The Plains Health Region

In Case Study 3, I used qualitative case study research involving participant observation and in-depth interviews to undertake a contemporaneous examination of what Liamputtong (2009b) refers to as the 'real life' (p.190) Patient Administration System (PAS) implementation work of a defined social group, specifically a trio of HIMs. The Plains Health Region's IT Alliance, so-named for

the purposes of this research, managed ICT developments and services for the region's 10 healthcare agencies (hospitals) and their multiple associated acute, non-acute, sub-acute and community-based healthcare facilities throughout a large region in rural Australia. In an initiative that was integral to the health-ICT policy of the government of that state, the case study participants implemented a PAS in the 10 widely-dispersed hospitals and their associated facilities.

Selection of the case study

This small, instrumental case study was selected via purposive sampling from my existing professional networks and contacts, the timing of the PAS implementation also being a consideration.

Methods of collecting empirical materials

In-depth interviews

Australia-wide cohort

I conducted face-to-face, ethnographic (in-depth) interviews with an Australia-wide cohort of 55 HIMs including an in-depth, telephone interview with one participant. Fifty-four of these interviews were conducted with singletons and one with a pair of HIMs, per the expressed preference of the latter because they worked in different roles in the same large hospital. The purpose of the in-depth interviews was to elicit details of what it is that HIMs do throughout the Australian healthcare system.

Case Studies 1 and 3: in-depth interviews

I also conducted face-to-face, in-depth interviews with 18 HIMs in Case Study 1, which explored the work of the HIMs in a metropolitan healthcare network.

In Case Study 3 I undertook face-to-face, in-depth interviews with six key actors (in addition to ethnographic observation, described below).

The data sources and data collection methods are shown in Table 1.

Table 1 Summary of data collection methods

Data sources	Total number of participants	In-depth interview	Ethnographic observation
Australia-wide cohort of Health Information Managers	55	all (55)	---
Case Study 1: The Royal Healthcare Network	18	all (18)	---
Case Study 2: The State-wide ICD Coding Committee	18 members	---	all (18)
Case Study 3: The Plains Health Region	17	6	all (17)

Research settings

All interviews, in the Australia-wide cohort and Case Studies 1 and 3, were conducted in private to allow an uninterrupted participant-researcher exchange. The venues reflected choices of the participants, who were invited to nominate the most convenient location. This was usually the participant's office or a meeting room in his or her workplace. Four interviews were conducted in non-office spaces, and one via telephone owing to geographical distance. At the participants' request, and for their convenience, two interviews were conducted in a private room at the university where I work.

The interview schedule

I used an interview schedule (guide) with a set of formal questions ([Appendix 4](#)). Several question-types were also interposed during the interviews as I was sensitive to re-ordering the pre-planned questions in response to the individual, in-depth interview situation and the individual participants' answers.

The interview process

In approaching the interviews, I was alert to potential issues including complexities underlying the exercise and, as cautioned by Allmark, et al (2009), and Vähäsantanen and Saarinen (2012), distribution of power by interviewer and interviewee, particularly in the context of my position as a well-known HIM academic.

In the manner described by Legard, Keegan and Ward (2003) and Liamputtong (2009b), I opened and directed each in-depth interview conversation by posing questions that were answered by the participants. I began all interviews with a 'rapport-building process' as recommended by Dickson-

Swift, et al. (2006, p.856; 2007, p.331) before segueing into what Fontana and Prokos (2007) describe as closed-format 'introductory' (p.70) questions to obtain background information on each participant's professional work.

My objective was to encourage a smoothly flowing, relaxed interview; therefore, following Liamputtong (2009b) and Fontana and Prokos (2007), I shifted the mode of questioning to generate more detailed responses, including using open-ended questions to elicit narratives about current and previous work, and skills and knowledges required and applied. These questions were interspersed, as needed, with what Liamputtong (2009b) describes as probing, specifying or indirect questions when I sought explication or clarification of points or needed to frame the participant's perspectives and experiences within his or her understandings of the wider profession. Occasionally, again following Liamputtong (2009b), when an interpreting question was required I rephrased the participant's answer in an effort to clarify the response.

Conscious of my participants' tone of voice and body language, I sometimes adopted the device of a short pause to encourage amplification of a response, as recommended by Legard, Keegan and Ward (2003) and Liamputtong (2009b). At the conclusion of each interview, I invited each participant to add further comment.

Some participants informally extended the discussion, post-interview. This behaviour was consistent with the observations of Legard, Keegan and Ward (2003). On occasion and with that participant's permission, I re-activated the recording device to capture a short additional explanation.

Recording the interviews

The anticipated complexity and duration of the in-depth interviews necessitated audio-recording and transcription of the dialogue into electronic text formats. Each participant was advised at initial contact and reminded via written (emailed) confirmation of the interview appointment, that the interview would be audio-recorded. All participants agreed to the recording. A small MP3 digital audio transcription device was used for audio-recording. I downloaded each recorded interview to a secure computer, prior to transcription.

Interrupting the recording

In most cases the recording lasted, uninterrupted, for the duration of the interview. In four instances the device was turned off briefly when participants expressed a wish not to record commentary on a particularly sensitive issue, or confided a personal matter that I adjudged to be irrelevant to the research objectives. This deliberate, non-recording quarantined these asides as they fell beyond the boundaries of the HIMs' consent.

Transcribing the interviews

The process of transcribing constitutes both an interpretive and a situated act in '(re)presenting original oral language in written form' (Bird 2005, p.227). It can embody the dual functions of creating a 'product' (Bird 2005, p.232) and constituting methodological process.

Following Bird (2005), I was conscious of my duty, as researcher-transcriber, to be alert to the interpretative nature of transcription when channelling the participants' voices. I therefore utilised a system that subsequently allowed a layering of the transcription. Every word was transcribed and I undertook several 'passes' in processing each transcript of interview. In the first 'pass' the responses were transcribed, verbatim, and incidental events such as laughter and pauses were bracketed. The names of organisations and identifiable individuals were transcribed, and bracketed and highlighted for subsequent de-identification. In the second 'pass', the recording was re-heard, and the transcript re-checked and de-identified as described earlier in this chapter. The third 'pass' involved a review of the transcript, and format conversion in preparation for analysis.

Methods of collecting empirical materials: case studies***Case Study 1. Health Information Managers' work in an area health network****Data collection methods*

The HIMs managed the collective Health Information Services (HIS) and undertook other network-wide health information-related functions throughout the network's health services and facilities. As described above, I conducted face-to-face, in-depth interviews with 18 of the network's 24 HIMs. My objective was to elicit details and perspectives of their responsibilities, activities and work outcomes within an environment of direct-care provision.

Case study framework and setting

The interviews were conducted on-site at different campuses of the network, over a six-month period.

The research process

In the first instance, I contacted the Director of Health Information Services who, as a 'gatekeeper' in the manner described by Silverman (2013, p.445) and Liamputtong (2009b, p.154), held the authority to grant or refuse my access to the research setting. I requested her permission to use the network with the intention of achieving a hologram of HIMs' healthcare facility-based work. She gave approval and referred my request to both the network's senior Executive and her HIM leadership team, all of whom agreed to my presence on-campus and to my approaching any or all of the HIMs for the purpose of my case study research.

My intention was to minimise my intrusion on the day-to-day operational health information management work throughout the network.

Progressively, I contacted potential participants, verbally or in writing via email, explained my research project, and formally requested an interview. Upon receipt of each potential participant's agreement, I followed the consent processes outlined previously in this chapter. I used the interview schedule (guide) and supplemented this with additional question-types as described earlier in this chapter, to elicit details of the HIMs' responsibilities. My intention was to derive, iteratively, a panorama of the work of HIMs throughout the network. Theoretical saturation was reached after 18 in-depth interviews, at which point I had accrued sufficient data to explicate my categories (Charmaz 2006; Starks and Brown Trinidad 2007).

The findings of this case study are reported in Chapter 6. In the discussion and conclusions to this dissertation (Chapter 8), they are referenced to the findings from the interviews with the large cohort of HIMs from around Australia.

Case Study 2. Decision-making in health classification*The State-wide International Classification of Diseases (ICD) Coding Committee (SICC)*

This peak body arbitrated on classificatory queries from a state's hospitals, created and interpreted rulings on classification- and casemix-related standards, and guided health classification and casemix practice. It also served as the expert advisory body for the classificatory, casemix, hospital admission, and related policies of that state's Department of Health.

As an instrumental case study in the manner described by Stake (2003), the SICC was a coherent, bounded entity differentiated by its size, composition, and scope of work.

Research setting

The SICC met in the state Department of Health's capital city headquarters.

Data collection methods: ethnographic observation

I used a qualitative case study approach, as described by Stake (2003) and Baxter and Jack (2008), to gain a snapshot of the SICC's workings and decisions through ethnographic observation of the expert, classificatory decision-making of its members, all of whom were HIMs. I observed the committee's work and recorded my observations of the technical discussions and decisions in handwritten field notes. When an apparently sensitive issue was raised in the meetings, I put down my pen. I explicitly avoided using video- or audio-recording in order to minimise the impact of my presence on individual members and the committee as an entity. I especially did not wish to impede the anticipated, reputedly vigorous and intensive debate in which this committee was known to engage.

Once away from the research environment, I reviewed these notes and summarised them into more general, coherent statements. I subsequently transcribed the handwritten notes, which contained rich data, into electronic Microsoft Word documents for ease of reference and to retain legibility and meaning for the analysis process.

The research process

I initially approached the chair of the Committee, as gatekeeper, for permission to observe its workings (Silverman 2013; Liamputtong 2009b). The Chair subsequently referred my request both to her superiors, who agreed to the research, and to the next monthly meeting. The committee members unanimously gave permission for the type of observation requested. I note at this point that it was commonplace for interested persons – government employees, students and others – to observe this committee in operation. The consent process has been outlined earlier in this chapter.

The SICC convened monthly for a day-long meeting in the DoH's capital city head office. Arriving early, I ascertained from the Chair positioning appropriate for my non-intrusive presence throughout the sessions. Known professionally to most committee members, I deliberately kept pre-meeting communications brief and low-key. Throughout the meeting sessions I sat away from the meeting table and engaged neither verbally nor non-verbally with the members. During the meetings, the committee members seemed oblivious to my presence, possibly because the attendance of observers was commonplace. The findings of this case study are reported in Chapter 7.

Case Study 3. Implementing a Patient Administration System across a region

As a bounded system in the manner described by Stake (2003), this case study was defined temporally within the period from three months prior to Go-live (explained by Hanken and Murphy [2012] as the actual implementation of the system for use) to 18 months after Go-live, the end-point of the PAS implementation. As researcher-observer, I was what Goffman (1989, p.126) describes as 'witness' to the implementation across-distance.

The research settings

Spatially, the case was constrained by the geographical boundaries of the Plains Health Region. The research setting was primarily the IT Alliance headquarters, based in the region's largest city. In-depth interviews with the Chair of the Steering Committee and the user-HIM and were undertaken in their respective hospital-workplaces in two smaller cities in the region.

Data collection methods

I aimed to build a 'thick description' (Bijker, Hughes, and Pinch 1987, p.5; Liamputtong 2009b, p.25) by eliciting data from multiple sources and in sufficient detail to gain insight into the HIMs' implementing work. I adopted Berg's (2001) recommended techniques of participant observation and in-depth interviews for researching implementation processes through which technology and organisation interrelate and become mutually transformative.

Participant observation

In this case study, I adopted an ethnographic approach using participant observation. I unobtrusively shadowed the implementation team in their work for short periods in the three-month lead-up to Go-live. The three implementing HIMs were targeted as they progressed through critical milestones. During the team's formal meetings and teleconferences I unobtrusively made contemporaneous, hand-written field notes, as described above for Case Study 2.

I engaged in informal discussions with the HIMs outside of meetings and was constantly sensitive to the need to remain, colloquially speaking, a "part of the wallpaper". I also recorded these observations in contemporaneous hand-written field notes, updated after leaving the site.

In-depth interviews

I also conducted face-to-face, in-depth interviews, another qualitative research method used in ethnography, with the three implementing HIMs, Chair of the Steering Committee, IT Manager, and a HIM-user who was Chief HIM of one of the implementation agencies. These interviews were conducted, audio-recorded, transcribed and analysed in the manner described previously in this chapter.

The research process

In initiating this component of the research I separately approached what Liamputtong (2009b) and Silverman (2013) describe as the gatekeepers, namely the Executive Officer of the IT Alliance for The Plains Health Region and the HIM who was the Project Implementation Manager. Communicating verbally and in writing via email I explained my research, and sought and obtained

their permission to come 'on-campus' at the IT Alliance headquarters to observe the HIM implementation team at work.

I then explained my research to the Chairpersons of the project committees, and sought and obtained approval to observe their meetings. Some meetings were conducted over distance, via videoconference between project headquarters and the 10 hospital (agency) sites. This necessitated the emailing or faxing of consent documentation ahead of time to the 17 members. The members returned the completed consent forms to me before each meeting. Before the start of each meeting, committee members were further reminded about the research project in the manner described earlier in this chapter.

Details of the findings from this case study will also be found in Chapter 7, in which both Case Studies 2 and 3 are presented.

Analysing the empirical materials

Tools in analysis

I elected to use a computer-assisted approach to support manual analysis of the data: this involved using powerful Microsoft Word capabilities of search and find functionalities and highlighting, merging and pasting functions. This approach has been lauded by Liamputtong (2009a, 2009b) and Ryan (2004) as benefitting retention of the narrative flow of the data and retaining its richness. I was able, thusly, to identify and code themes, get close to the data, and gain a sense and impression of the weight of the themes through analysis and classification. This was after initially using the computer-aided qualitative data analysis software, Nvivo. Notwithstanding its many benefits I found that it did not enable sufficient closeness to my large pool of data; rather, it interposed a 'buffer' (Buchanan and Jones 2010, p.4) or form of divide as explained by Gibbs, Friesen and Mangabeira (2002), Liamputtong (2009a) and Baxter and Jack (2008). This distancing of researcher from data is recognised by Baxter and Jack (2008) as 'one of the greatest drawbacks' (p.554) associated with computer-aided approaches. These can restrict rather than aid the analytical process and, according to authorities including Blismas and Dainty (2003), Buchanan and Jones (2010) and Charmaz (2003), create the risk of over-coding associated with fragmentation and uni-dimensionalising of the data.

Qualitative descriptive approach

Informed by the interpretive tradition and my methodological framework, my data analysis was undertaken by the application of the qualitative descriptive approach with the intent to build upon theory from the interdisciplinary sources presented in Chapters 1, 2 and 3, and to build further theory or what Giacomini (2011) describes as ‘a system of ideas’ (p.128) that would contribute to knowledge in the field of health information management. This enabled me to apply inductive description in constructing accounts of the case studies and ultimately, following Yin (2003), to generalise to theory rather than to like cases (Giacomini 2011).

There have been shifts, from Glaser and Strauss’ (1967) original grounded, classical approach in qualitative methods to what Glaser (1992) describes as theory verification (as opposed to generation), through to the sometimes contested approaches of Charmaz (2006), Charmaz and Bryant (2011), and others who acknowledge the interpretive role of the researcher in socially constructing theory (Pawluch and Neiterman 2011). In adopting a qualitative descriptive (as opposed to grounded theory) approach I have drawn upon the rigour of Charmaz’s (2003, 2006) approach to coding.

Analytical process

My intention was to remain as close as possible to the data in order to tell the story of the HIMs as effectively as possible. In the manner described by Janesick (2003), the key categories, themes and patterns emerged from the data. In the interviews of the Australia-wide cohort, and in Case Studies 1 and 3, data were collected until what Charmaz (2006), Silverman (2014), and Starks and Brown Trinidad (2007) describe as theoretical saturation was reached and it seemed likely that fresh data would not produce new insights into the HIMs’ work. Similarly, the observations of the participants and their classificatory decision-making in Case Study 2 were ceased at the point of theoretical saturation, when it appeared likely that the observation of further clinical patient-case decisions would not elicit more useful information.

Open coding

Firstly, in adopting a process of open coding I carefully read and re-read each transcript and field note and re-listened to the transcripts to familiarise myself with the data and identify salient words,

events and emergent themes. Descriptions of the HIMs' accounts and the key themes were coded broadly and supported by examples or explanatory statements, where relevant. Examples are shown in Table 2. I was therefore able to build, iteratively, an initial set of provisional codes that 'best fit[ted] the data' (Charmaz 2006, p.48). I aimed to keep the coding and the codes open, simple and precise so as to reflect nuances in the data and to flexibilise my analysis. In the manner described by Charmaz (2006), I coded at sentence and, on occasion, word-level, and constantly refined and re-coded through merging and de-merging of themes.

Table 2 Examples of the open coding

Excerpt from transcript	Context	Provisional codes
'... [I] project-manage all of our audits with hospitals. So we engage [names HIM national coding auditing consultancy firm] once a year. We usually do about four hospitals, do a random sample of the hospitals that are on our DRG-base model and we go and audit those, so I manage that as well' (019).	HIM, health insurance company	Audits. Auditing. Coding and data auditing. Data integrity.
'IT didn't actually tell Coding what they were extracting so there was no clean-up of the data. Performance were reporting on it but didn't really understand what they had, and for Finance it was just money ... there was no-one in the Clinical Coding Department who could talk IT. It is just not their background. And nobody in Performance would really talk to IT. And there was just no person who understood all of it. We used to sit there saying "The Health Information Manager has the finance, the IT, the performance and the coding." And I said "I can do this"' (026, relating experience in a large UK hospital).	HIM, specialist teaching hospital	Boundary Work. Boundary Crossing. Dealing with others/other disciplines. Domains of professional knowledge.
'... keeping in touch with the transition to the electronic record and having some participation and ownership of that so that it doesn't get taken away from them ... this is what we've been trying to do here, saying "Unless you engage and start to change your focus and think that your only thing is the paper, then you're just going to get left behind because you're going to have these health informatics persons sitting in an IT department who are just going to run the whole thing." And whilst some of them are Health Information Managers, not all of them are ... And they [HIMs] need ... a different focus ... on the release of information from the electronic system' (049).	Director, Clinical Information Services, Area Health Network	Electronic health records: ownership. Challenges. Transitioning to the EHR. Technologising. Professional role.
'... whilst we have lots of KPIs, a lot of them aren't the quality-focused KPIs so we are trying to look at whether we can use our coding, our coded data, for that as well' (009)	Director, Health Information Services, Area Health Network	Patient safety and quality. Coded data – applications.
"I work in a hospital. No, I'm not a nurse, I work in admin"' (005, explaining how s/he describes his or her professional role).	Mental Health Information Manager	Promotion of profession or HIM status.

Theoretical categories gradually emerged through comparisons, or 'constant comparative methods' (Charmaz 2006, p.54), between the participants' observations, opinions, and understandings of

their health information managing. I was attentive to 'in vivo codes' (Charmaz 2006, p.55; Liamputtong 2009a, p.134) reflecting terms known to HIMs that captured meanings or experience and to 'insider shorthand terms' (Charmaz 2006, p.55) that conveyed their perspectives.

Axial coding

Leading qualitative researchers espouse differing approaches to 'axial coding' (Liamputtong 2009b, p.217). Drawn more by the style of Charmaz (2006) than of Strauss and Corbin (1998), I established a frame to link categories with sub-categories and reassembled the data that had been fractured during the initial, open coding. This helped me, in Charmaz's (2006) terms, to make sense of the data.

Focused coding

During what Charmaz (2006) describes as the 'focused' (p.57) coding phase, I re-sifted the data, tested the codes for explanatory relevance and, in the manner outlined by Liamputtong (2009b), concentrated on deriving connections between categories and sub-categories in the emerging themes. I used the technique of very brief memo writing to probe the data for implicit and embedded meanings, make comparisons, and identify connections.

Thusly, I incrementally established very large, cumulative data files containing the key, coded themes that emerged from the collective components of my research. I systematically and recursively cross-checked these against the transcripts. I pasted core statements from the right column of each transcript into the cumulative data document according to the key, coded themes. Finally, I revised and iteratively re-coded, merged, or de-merged the themes as necessary, and cross-checked themes, concepts, phrases and sentences that underpinned the codes. The axial coding and focused coding are shown in [Appendix 5](#). The four sets of data thus separately and collectively informed the study. Common themes emerged from the interview data (Australia-wide cohort, and Case Studies 1 and 3) and from the hand-written research notes (Case Study 2), each providing insights into HIMs' work and therefore strengthening my conclusions, reported in Chapter 8.

Re-visiting the theoretical lens

The interviews and case studies have been approached via the theoretical lens of some key theories introduced in Chapters 1, 2 and 3. For instance, Latour (1987, 1991) and Latour and Woolgar's (1986) foci on scientific work and translation work, and Latour's (1987) theory on the achievement of scientific work through inscriptions, are applied to the work of HIMs as revealed in the current in-depth interviews; the concept of scientists as articulation workers (seen here in the context of HIMs' scientific, articulation work) is also important here. Latour's (1987) thinking (interpreted by Berg and Goorman [1999]) concerns the 'core component of scientific work' (Berg and Goorman 1999, p.57) reflected in the HIMs' disentangling and mobilising of health information to a wider arena. The theme of production of order from disorder, or the sacred from the profane (Douglas 1966; Durkheim 1995; Durkheim and Mauss 1963) is also highly relevant here. We recall, from Chapter 2, Latour's (1999) reading of the production of scientific facts, artifacts and texts and the concept of opening the 'black box' (Pinch and Bijker 1984, p. 440) of technologies to understand scientific or technological functioning. Latour's (1987) and Callon's (1986) critical approaches to technology as text are also seen to be reflective of the health information management technologies. It is useful also to recall Latour's (1987) accumulation cycle in observing the HIMs' constant re-calculation and rendering of health data into scientific facts.

Importantly, in uncovering HIMs' active engagement within their information ecologies, we recall Nardi and O'Day's (1999) holistic, ecological approach, first introduced in Chapter 1 and explicated in Chapter 3, which considers technological developments and their social implications. We also recall from Chapter 3 that Star (1999), Nardi and O'Day (1999), and Star and Strauss (1999) point out the taken-for-grantedness of certain work that, even when visibly undertaken, may be rendered invisible; in these cases the worker, also, may be rendered invisible (Bowker and Star 1999).

Case Study 1 is seen through the lens of Star and Griesemer's (1989) information ecology model which extends Callon's notion that scientific work involves important strategic alliances and also utilises methods standardisation and the development of boundary objects as critical activities for translation work.

Case Study 2 investigates specialised classificatory decision-making and reminds us of Latour's (1988) theory that order 'is extracted ... from orders' (p.161), in the context of classification as ordering. We recall Timmermans, Bowker and Star's (1998) concept of classifications as providing organisational memory and a mechanism for 'bureaucratic control' (p.122). We are drawn similarly to Star and Bowker (1995), Star and Ruhleder (1996), and Bowker and Star's (1999) focus on the ICD classification as a boundary infrastructure. The analysis and interpretation of this Case Study is influenced by Bowker and Star's (1999) thinking that work on classification systems so important as to constitute 'one of the central kinds of work of modernity' (p.13).

Case Study 3 draws upon three theoretical frames in the interpretation of the across-distance health information system implementation; these are Hutchins' (2001) theory of distributed cognition, McKenzie's (2003) description of workers' distance-based development and operation of a large-scale system and, finally, the recurring theme throughout this thesis, specifically the imposition of order from disorder. The latter recalls the transformation of the profane to the sacred, as described in Chapters 2 and 3 (Douglas 1966; Durkheim 1995; Durkheim and Mauss 1963) and, additionally, reflects Star's (1995b) notion of making sense of 'the disorder of workplaces' (p.97).

Chapter summary

The rationale, theoretical, and HIM practice contextualisation for this original research on health information management in Australia, and the methods and methodology, have been described in this and the preceding chapters. I have now demonstrated that this study, which addresses the original, researchable problem of health information management in Australia, is of significant import to Health Information Managers and to the wider healthcare system.

The findings from the empirical work are presented in the following three chapters. In Chapter 5, the findings are elucidated from the in-depth interviews with HIMs working throughout the Australian healthcare system. Chapter 6 examines the case study of the work of HIMs in a metropolitan area health network. Chapter 7 describes the case studies reflecting two specialty areas of HIMs' work, specifically infrastructuring a health classification, and implementing a health information system.

Chapter 5

The work of Australia's Health Information Managers

Introduction

I always remind them [doctors] that I'm in health for the same reason as them and even though I talk about numbers and letters and figures and graphs and I can quote DRGs and things that they know nothing about, I'm actually here for the same reason (045).

In the previous chapter I presented the methodology employed in this study and the methods used to conduct it. The different groups of participants were described. These included a cohort of HIMs drawn from across the profession, Australia-wide: this collective of 55 respondents constituted the largest single component of the data sources. In this, the first of three findings chapters, I describe my findings in relation to this cohort.

Outline of this chapter

The chapter begins with a profile of Australia's HIMs and describes the most common themes surrounding their health information managing. The first section provides descriptions of what it is that HIMs do; this includes their changing roles involving standardising, bureaucratising, technologising, and data-related work, and their protection of health information privacy. The second section offers the HIMs' perceptions of the profession's contemporary discourses.

Anonymisation

In order to preserve the anonymity of respondents and their employing organisations, common or composite descriptors, per Table 3, have been used in the reporting of results. In the de-identification process, a unique number has been used for each participant.

Table 3 Composite and common terms used to describe organisational and position titles

Composite (or common) term used	Actual terms
Area Health Network	Area Health Service; Area Health Network; Health Services Network; Local Health Network; Local Health District; Local Area Network.
Coding Manager	Coding Manager; Coding Co-ordinator; Coding and Casemix Manager.
Director, Health Information Service	Director, Health Information Service; Director, Clinical Information Service; Head, Patient Information Services; Chief Health Information Manager; Manager, Patient Information Administrative Services.
Health Information Service	Health Information Service; Clinical Information Service; Patient Information Services; Patient Information Administrative Services; Medical Record Department.

What Australia's Health Information Managers do

Where the HIMs work

The HIM participants in this study operated throughout the healthcare sector at local, state and national levels. Some were in area health networks (AHN) that incorporated some of the largest and most prestigious hospitals in the nation, or in community-based agencies or sub- and non-acute healthcare services. Others worked in the private hospital sector, private practice, or independently as consultants. The HIMs were employed by governments and statutory bodies, commercial computer and health software firms, health insurance funds, and disease surveillance, health classification, casemix, epidemiological research, and clinical trials centres.

Career trajectories and roles

The participants had spent between seven and 40 years in the profession. They recounted career histories revealing professional-role flexibility and mobility. Many had segued between different sub-sectors of the healthcare industry, notwithstanding the challenges, e.g. when moving from sub-acute to the acute care environment 'the reporting requirement is ... hugely different' (069). The knowledge and expertise required of incumbent HIMs in small facilities imitated those in larger institutions, sometimes involving broader reach.

The 'traditional' role

'You must be able to find a medical record in three minutes.' And I never forget that You have to have the systems to back that up. To me that is a basis for patient care (042, recalling her university professor's instruction).

This HIM was referring to a paper-based medical record environment supported by manual systems reflective of the 'traditional' role described in Chapter 2 (Box 2). This included staff and systems management, classification, and responsibility for hospital activity statistics, research, and medico-legal compliance with subpoenas.

The 'contemporary traditional' role

The prevailing perspective of the traditional role of a junior or mid-level HIM in a hospital HIS was 'split between coding and a little bit of staff management' (069), and predicted to 'lessen over time' (069) because of progressive implementation of digital and electronic health records (EHRs). One

regional hospital's Director-HIS exemplified a contemporary version of the 'traditional' role: 'I am responsible for the Medical Record Department ... a substantive establishment' (053). The following Director-HIS in a specialist tertiary hospital in a different state, managed:

50 EFT budgeted ... clerical and managerial staff, and ... Outpatients, Inpatients, Emergency [medical record] retrieval. We are open 24 hours a day ... And the managerial staff do largely code, as well as manage (015).

The 'very significant' (005) HIS management role included consultancy advice and responses to *ad hoc* queries and requests. The Director-HIS or the Deputy was the intermediary sought out by individuals from within and beyond the organisation, e.g: 'people go to me ... Mental Health [Services] or people out in the Community [Health Services] ... [I am] very much a resource not just for the site but for the greater region' (053). The 'contemporary traditional' role provided an under-recognised service:

I still think of myself as in the traditional role ... it's a service that you're providing to the rest of the hospital and it is something that often is not recognised but it is hard even to keep the morale up and the team spirit going in your clerical staff because it is a service that doesn't get recognised in most organisations, very much (017).

An 'extended traditional' role

The following comment is reflective of what I term an 'extended traditional' role: '[w]e try and approach it so that our [HIS] service has no walls. It runs the breadth of the organisation' (043).

The traditional role had expanded in the late 1970s with 'a lot more HIMs working in community settings' (004). A former Deputy-Chief Medical Record Librarian (MRL) in one of the nation's largest hospitals recalled: 'the [Medical Record] Department grew into a Patient Services Department so we took on the Admission Offices ... Bookings, Bed Allocations' (051). Some participants recalled that in that era the Chief MRLs (or Medical Record Administrators) assumed management of hospital-wide and front-of-house patient administrative staff and systems: the hospital statistics team; reception and switchboard; administrative staff in operating theatres, wards, Outpatient and Emergency Departments (ED); and '... surgical lists, Theatre Booking systems, and IT staff and infrastructure development' (050). This role's universality incorporated outback, rural, regional and metropolitan Australia, as related by a regional health service's HIM:

I have managed Reception ... Patient Transport ... Library ... I would still see the primary role of managing patient medical records, health information and that itself is a broad thing because I also consult on the medical record, patient information, privacy, confidentiality ... within the organisation

... not just the hospital, we ... have two Nursing Homes ... Community Services ... a large Allied Health Department and District Nursing (011).

The practice brief accommodated organisational need: 'Whenever I've worked in a smaller organisation I have tended to be responsible also for other areas' (011). In metropolitan hospitals the extended role involved sizeable staff establishments. It also demonstrated 'that enormous diversity in the career' (080) that enabled HIMs to grow 'in any number of directions ... [including] beyond those walls [of the Health Information Service]' (080).

Some hospital HIMs had a more circumscribed ambit of authority consequent upon exigencies of labour-force shortages and funding or political environments. For instance, the state of Victoria's casemix-based funding model necessitated the deployment of as many HIMs as possible in health classification and casemix-related roles for hospital revenue maximisation: 'our coding and casemix is so complex that we need an HIM to do it' (016). Victorian hospitals utilised HIMs' expertise 'to get the casemix [classification] done and from a funding point of view' (006) rather than deploying them to manage more widely across the agency. The HIMs were increasing their focus on data.

Increasing complexity: a 'data globalisation' role

A transitioning to a complexified, strategic, analytical role was seen in the responsibilities of the following Director-HIS. These included systems and data management, 200 staff, and hospital-wide functions:

PAS and ED Clerical ... Clinical Support Officers located throughout the hospital supporting Clinical Managers ... We organise ... a hospital-wide admin casual pool ... the Casemix and Research Manager who looks after Coding, Casemix [and] the research functions of the hospital ... Patient Registration and WaitList Manager ... Admissions ... Outpatient Services Business Manager [responsible for] making sure that finance systems are bringing in the revenue [for] Outpatient Services (043).

There remained a need for HIMs' managerial skills and understandings of patient and information flows and systems to support the organisation in a climate favouring increased efficiency and productivity. To this end, the Director-HIS role was typically 'very dynamic [and] ... 85% of my role is conflict management between people or ... processes or systems ... If we can create 5% efficiency in our processes it's giving us resources or time back' (043). Many Directors-HIS delegated operational functions to their senior HIMs and prioritised a 'very strategic [role] with very little operational responsibility. Lots of policy writing ... policy development. Procedure development ... getting

strategies around information management' (070). Communications, mainly with senior AHN staff and, externally, DoH, state Privacy Commissioner, and government experts, involved 'liaison with people around things that are ... bigger picture' (070).

The focus on data analysis to inform the Board of Directors and the senior management team³⁶ reflected that 'the role has changed and [its] position in the organisation has changed as the technology has been implemented ... it has gone from being paper-based, paper-driven, coding ... to something so much bigger' (012). There was extensive, 'regular reporting' (043), and a 'big shift ... around IT' (004). '[B]ig Medical Record Departments that store paper' (004) were predicted to reduce; for instance, '[i]n a smaller hospital you tend to take over a lot more departments and ... roles' (050), and the typical 'old role with lots of clerical staff reporting to someone ... in charge of a department full of ... medical records and staff, presumably that changes' (048). 043, in a large tertiary-level hospital, asserted that '[a]ny piece of information that we hold is something that we are responsible for and need to be either taking some control over or advising on' (043). The focus of the profession was gravitating:

... more into IT-related areas [and around] the HIMs' understanding of the data. Because we understand how the data are created and where they come from, it positions the profession well to move into roles related to the activity-based funding or the patient quality [of care] ... anything ... where you can relate back to the patient data (048).

The following Director-HIS, for example, had carriage of a network's health information comprising the HISs, Data Group, and Clinical Costing and Activity Monitoring Units. Hers was a significant leadership and advisory role:

I don't do much here [in the HIS] on a day-to-day basis. I have got a Casemix-Coding Manager and ... Operations Manager ... [Mine] is really an advisory role for not only [AHN's tertiary hospitals] ... I also provide advice to [rehabilitation facility] and also for Mental Health ... [Those] HIMs ... report to me (009).

Career trajectory 1

This shifting role is seen in 059's career trajectory, outlined in Box 4. 059 worked in a hospital HIS throughout her 13-year career. As promotions eventuated, she undertook increasingly complex health data analysis and reporting.

³⁶ Henceforth referred to collectively as the Executive.

Box 4 Career trajectory 1*Health information management, classification, and analysis*

059's private hospital, graduate position constituted the 'traditional' role of Assistant Medical Record Manager. She later became Deputy Chief HIM; this operations position managed the staff, systems, day-to-day HIS and medico-legal functions, and involved some classification. 059 then became Director-HIS, by which time the hospital was highly casemix-oriented. She oversaw compliance with legislated medical record retention and disposal requirements, and undertook data retrieval, analysis and reporting to and for the hospital's Board of Directors, Executive, and clinicians. She performed hospital-wide Clinical Indicator (CI) monitoring, and managed the hospital's CI data submission to the Australian Council on Healthcare Standards (ACHS). She prepared clinical reports, based on coded, casemix, and CI data, for doctors and 24 clinical committees. Her casemix-related reporting informed the hospital's Executive team daily on patient throughput and revenue targets.

059 served on hospital committees (Medical Records, Mortality and Morbidity, Health Insurance Contracts, and Quality) and undertook projects involving casemix, clinical data and medical record analysis. She oversaw the medical documentation audit program, ensured HIS compliance with external accreditation standards, and reported hospital data to external authorities, per legislation.

Across the healthcare system

The hospital HIMs' work was mirrored, broadly, by HIMs who resided along the spectrum of health data and information throughout the healthcare system, including government: 'As a group they fit in all along, in multiple parts. No one HIM fits along the whole spectrum' (013). Arguably, their roles were 'much more expanded ... than ... 10-15 years ago ... which gives us lots more scope and also a lot more demand' (013).

Bureaucratic work

The HIMs acknowledged the bureaucratic minutiae of their professional role: 'It's that environment of bureaucracy that can play with you or play against you' (047). For example, 012 related that without the HIMs' time-critical work for the Mental Health Review Board, a patient's liberty could be impeded: the meticulously completed Involuntary Status documentation was referred to as 'a warrant ... copies ... are stored within the medical record because that's how the legal justification of any action that we may have to take [is confirmed]' (010).

Data collection and reporting

I understand the data more, because I know how we collect it, why we collect it, and how it's used, how it's interpreted (011).

Nationally, the HIMs were a 'resource' in 'sometimes creating the data ... [and] transmitting and submitting [them] to the Department of Health' (026) and per other statutory requirements: 'I am continually looking at the data that we collect on the computer system because I am the submission officer [to several government datasets]' (011). The data role was considered important: 'I'm very particular about what we're collecting ... and I am very much used as a resource to produce reports for staff' (011). The HIMs conveyed that their data managing and interpreting were essential to hospitals' business viability. They comprehensively analysed data for clinical reports for 'the doctors ... managers and Executives, activity reports' (059), 'internal reports for the Board [of Directors]' (012), and 'If [Executive Director] doesn't understand any activity for his Board reports he will ring me: "I don't understand this. Can you explain this to me"' (009). Confident in their expertise: 'We've got more knowledge of that' (011), they accessed the databases and extracted, analysed and reported on data, including 'long-term waits on the Waiting List' (011) and, indeed, 'anything to do with patient information, any requests for information ... come to me' (011).

Form design

Form design is both standardising and bureaucratic work. Undertaking specialised medical record form design and management, hospital HIMs did 'an enormous amount with forms and form design' (078). The HIMs managed the organisation-wide forms register and re-developed processes to accommodate new technologies: 'I am trying to get everything standardised, particularly with

scanning coming in ... each campus has its own Forms Committee' (069). The paper component of the hybrid UR, an offshoot of the slow developmental pace of EHR technologies, kept getting 'bigger and bigger' (011) and 'blowing out of all proportion' (078): 'We've got all of these computer systems but ... are still relying on the paper record and people keep developing new forms ... three or four sheets for a particular [clinical] procedure' (011). The volumes of UR forms were 'pretty horrendous' (007):

When I arrived ... [five years ago] there were probably 4,000 to 5,000 forms So there has been a huge clean-up ... There were 17 versions of Progress Notes ... We got that down to one. And then we had 58 different consent forms. We got those down to about 10 (007).

The HIMs needed to keep abreast of technology because form design was 'now an electronic activity' (012), and 'we're still the best people to design a form ... it's all that capturing of data' (060).

Patient identity and risk mitigation

The UR numbering system, supported by the PMI, was central to the concept of one patient-one medical record: 'The PMI is our bible' (078) and 'our most valuable reference. We use it all the time and it has to be right' (077). One HIM was asked by a senior manager: "'Can't we compromise on this?" And [we] said "No ... because it is best medical record practice and our professionalism requires this"' (077).

Risks deemed by the HIMs to be unacceptable for the integrity of patient and record identification included duplicate UR numbers and duplicate medical records. Potential patient safety issues arose when 'patients had duplicates in the system because they had multiple URs' (045), creating re-identification work in overseeing re-numbering of 'every single presentation to hospital before it [medical record] went out onto the ward' (045). Regional HIMs in different states related stories of inadequate consultation on decisions about patient identity, particularly centralisation of the PMI and changes to UR number allocation, despite these matters being squarely within the realm of their professional expertise: 'We were told all along [by IT] we didn't have a choice' (011). The associated risks discomfited the HIMs: 'Finding the medical record, that's the main reason why we have these unique numbers, is to make sure we can identify the record' (011). In one state there had been a poor, top-down IT decision:

A lot of these patients actually have two National Identifiers because of this duplication brought about by the lack of communication within the state ... the process of getting rid of these duplicates and making sure the patient remains safe is very tricky (045).

Health information science was critically important; for example, prior to 005's arrival duplicate medical records had been established at different campuses and services. This created legal, safety and management implications: 'it is not until you get a Health Information Manager who is going to pull this all together ... [otherwise] it's going to continue to be disparate and potentially cause problems' (005). Embedding mechanisms for data and system integrity, she interacted extensively with users:

... breaking down walls and trying to get people on side ... I am putting all the back data on and finding duplicates ... data cleansing because we're having a [replacement] Patient Master Index written [and] tested (005).

Accreditation

Healthcare facility HIMs were attuned to the need for high standards in documentation and systems for external accreditation purposes. Audits assumed importance: 'standards are vital' (015) and 'one of the criteria is coding auditing' (008). There were potentially dire financial consequences for non-compliant private hospitals: '... if you fail on that [mandatory standard] you can lose your accreditation status ... [and] you've lost your contract with the health fund' (058).

Classification work

Classification knowledge and skills were integral to the HIMs' professional functioning. Most participants had previously coded or were currently doing so. The predominant classification was the ICD-10-AM, Australian Classification of Health Interventions (ACHI), and ACS trilogy. The AR-DRG classification was also used in acute care. Participants reporting using specialised classifications for ABF data, e.g. for ED services (Urgency Related Groups and Urgency Disposition Groups), and for outpatient services (Tier 2 Non-Admitted Services classification), amongst others. Participants in the sub- and non-acute sectors used the *Australian National Sub-acute and Non-acute Patient Classification* for ABF, reporting, and national benchmarking. There was some use of SNOMED-CT and specialised classifications, e.g. the WHO's *International Classification of External Causes of Injury* was used for a national mortality database '[t]o make us internationally comparable' (018). Mental Health Information Managers referred to the *Diagnostic and Statistical*

Manual of Mental Disorders but coded with ICD-10-AM. Other classifications, including the *International Classification of Diseases for Oncology*, were used by HIMs in the arenas of medical research and epidemiology.

Career trajectory 2

Some participants specialised in classification as HIM-Clinical Coders, Coding or Casemix Managers, or in-house Coding Educators. With experience some became consultants, external Coding Auditors, or national-level Classification Specialists, or they focused on classification decision-support or health data quality. 045's story, related in Box 5, reflects the HIMs' skill portability and flexibility, and demonstrates the embeddedness of classification in their work.

Box 5 Career trajectory 2

Classification, health informatics, and health information management

045 was passionate about classification. As a junior HIM-Coder in a tertiary hospital she was mentored through the HIS's HIM-Coder training program, involving supervised coding in each of the hospital's medical and surgical specialties. She eventually advanced to become Coding Auditor and Educator for the team of 25 HIM-Coders, monitored new graduates' training plans and organised HIM-Coders' professional development in clinical updates, technologies, and technical coding. She managed the internal coding auditing program: allocated to a clinical unit, the HIM-Coders presented to doctors cases involving a documentation query or deficiency, or a code assignment that 'didn't quite reflect the procedure performed' (045). She prepared financial reports on the impacts of coding on clinical units' revenues, explaining:

We've audited [x] records from your unit and this [shows] the changes that we found and this is the WIES [Weighted Inlier-Equivalent Separation³⁷] ... I've got a few more queries ... The documentation is a bit deficient. If we can clarify these then this will result in additional funding (045).

045 offered ethical justification: 'I'm not going to amend the details because of a financial reason. I'm amending it because you've told me that ... the clinical care reflected that that was wrong with the patient' (045). She later assumed a traditional hospital HIM role but, missing the intense classificatory work, moved to a specialist tertiary hospital as Coding Manager of '[HIM-Coders] who were professionals ... enthusiastic ... loved their job' (045). She extracted and analysed coded data, and prepared reports and commentaries on 'let's say ... teenage pregnancies within a demographic radius of [...] and who ... were smokers' (045). Another example was the annual clinical report prepared by the HIM-Coders who 'sat with the [doctors] and

³⁷ Weighted Inlier-Equivalent Separation: a weighted activity unit used in one state. It is based on an algorithm linking cost of care and treatment, the DRG, the amount due in revenue, and multiple other variables including length of stay.

went through the results ... explained the variances ... When they say “This [coded data] is wrong” you ... explain ... the limitations’ (045). 045 assisted in a PAS implementation. She gained certification as an external Clinical Coding Auditor and intermittently worked in teams auditing hospitals’ coding on behalf of a state government, as funder.

Moving to a state that had few HIMs, 045 shifted direction: she managed the HISs and patient-related administrative services for a regional AHN’s six hospitals and multiple community-based agencies. First, she implemented a new PAS and managed the process re-engineering, procedure development, staff training, and the health information science issues around duplicate UR numbers when transitioning to a universal numbering system. 045 then commenced digitisation of medical records to improve their accessibility to clinicians. She aspired ultimately to implement a network-wide EHR.

The centrality of classification

The ubiquity of coding in their professional work was reflective of the HIMs’ widely-held view of classification as a key competency for professional performance: ‘coding drives a lot of your background’ (009). It was considered central to hospitals’ functioning: ‘I see coding as one of the more important aspects of HIM ... it’s driving a lot of our [hospital] activity and ... performance’ (009). Coding was perceived to be important technological work at societal level ‘from an epidemiological perspective’ (007). There was cognisance of the immediate and downstream uses of coded data, e.g:

What I do makes a difference in the world ... What I do is important ... you’re contributing to society a little bit ... ‘Oh, I code this. They use that for research and statistics. They will take that for public policy’ ... what they [HIM-Clinical Coders] do is core (062).

The work of classifying

Classification was seen as ‘hugely complex’ (058) work. Not everybody could code well: ‘Some coders are a lot more competent than others’ (007). Pre-requisite were ‘a good eye for detail and data analysis’ (009), and specialised skills and knowledge: ‘It is a skill [and] it’s massive’ (083) and ‘a very specialised area’ (009). Beyond the HIS, ‘people don’t always know the depth of details we go [into] with coding’ (011). Regardless of whether coding decision-support software was used, code assignment required expert human judgement and informed decision-making consequent upon interpretation and application of the ACS:

[E]very case is different and even if they're the same diagnosis codes, the age ... [and] the co-morbidities are different. It's somebody's life and you're trying to determine which [codes] are relevant for this episode ... it is ... very challenging (062).

You're extracting the data ... the record is a rich history of all sorts of things ... you ... make a judgment call according to standards and, okay that could all be written into algorithms as well, but you still have to [determine] ... what you're going to extract and record for that episode of care, and what you're not (056).

Data for research

The ACS and their ongoing updates informed the identification of cases that met inclusion criteria for research projects. The HIMs' IT skill-sets were a necessary adjunct:

If any doctors wanted to do any research I pulled that out for them, and [contributed to] ... research projects ... selected the patients ... sometimes they would ask me actually to do the research, read through the record and [retrieve data] ... the best grounding that I got for that was the coding standards ... and understanding the records (063).

Several participants reported that for research requests, they retrieved, compared, and forward-mapped data coded in no-longer-extant classification systems or versions. Stability of the classification and, particularly, the standards was seen as essential for longitudinal data consistency, e.g: 'It has been very interesting having to pull data five, ten years back, particularly in the rehab area, and look at what has been coded and ... how difficult it actually is to pull some of the older stuff accurately' (007).

Telling the patient's story

The HIMs saw the patient as the primary beneficiary of their classificatory work: 'I always like to say the patient' (045), and 'everything should be patient-centred' (056). This concept was extended: coding discussions were permeated with the notion of telling and getting 'the [patient's] story right' (054) via the coded data. This was even perceived as a privilege. One HIM concluded her information sessions to doctors, thus:

I'm here for the same reason you are and that is for the patients. So whilst at the end of the day you get to talk to the patients and you treat them physically and you have a conversation with them I don't get that privilege, but the privilege I do get is that I can make sure that I tell their story, enter the right codes, and from that we can maximise our funding and that means better care for when they come in again or when someone else presents (045).

The inherently translational nature of the HIM-Coders' work was idiosyncratic: 'Records are written by the clinician who sees the patient and then it's coded and translated by the Health Information Manager who ... never sees that particular patient' (041). This distancial relationship, with HIM-Coder as translator of the patient's story, was explained by a hospital HIM-Coding Manager:

There is no direct 'What I do today helps that person tomorrow' but in that long-term cycle the information that we're collecting is obviously going into the research and population health ... we can say 'This patient had this and this' but that's the end of the story. Where's the rest of the story? ... Did they come back here or did they go somewhere else? Did they end up with chronic pain? Did they end up taking Panadol for the rest of their lives? Did they jump for joy? (062).

Adherence to the prevailing classification rules and standards was mandatory. The patient's coded 'story' was also constrained by government policy. Currently, only diagnoses (and procedures) documented by the treating doctor, and affecting length of stay (LOS), could be coded: 'if I have a doctor who's written [that] a final diagnosis is "whatever" ... We don't treat the patient ... [therefore] it's not up to us to argue that point' (056).

Shaping the classification

Collectively, the participants were engaged in all aspects of classification. Classification specialists worked across multiple communities of interest. They balanced stakeholders' requirements, clinical coherence, classification rules and standards, and WHO requirements for the ICD internationally, ensuring continuity of the classification for posterity via: 'an International [WHO] Chronicle and an Australian Chronicle' (056). One specialist had analysed or helped to build nursing, mental, community and allied health classification systems, and SNOMED-CT-AU³⁸ applications:

It's the analysis which I love ... I have got to get in and ... understand how that system works. And I have got to understand the model ... the way things are classified and structured (055).

Dialogue on changes to the ICD-10-AM and ACS filtered through the profession, shadowing tension between researchers' and government bureaucracies' differing requirements. The frequent changes reflected clinical practice and interests of 'different stakeholders ... all influential' (048). The changes created significant extra work for both HIM-Coders and HIMs who were coding decision-support software specialists. They could also impede the retrieval of high quality,

³⁸ The Australian version of the *Systematized Nomenclature of Medicine (Clinical Terms)*.

longitudinal morbidity data such as on Diabetes: 'At a hospital level ... I would defy anyone to pick out 15 years' worth of Diabetes complicated by Chronic Kidney Disease and Hypertension' (048).

The HIM classification software specialists developed the coding-decision pathways and created an electronic decision-support tool incorporating multiple edits to enhance productivity. Behind-the-scenes, they influenced and shaped the classification:

How the software deals with those grey areas does have the ability to influence the data ... if we can define something and make it clear what the rules of the classification are, then we expect that we are influencing how the data look because so many people use the tool (048).

Managerial and productivity considerations

Other technologies affected HIM-Coders' work: 'If you don't have a physical record, you view one electronically. That's the biggest change for coding' (012). In abstracting from the hybrid UR, HIM-Coders routinely searched multiple databases and components: 'It's not [having] confidence with where the notes will be ... some ... are in paper and some ... are online and some ... have been scanned' (062). The absence of a UR that was fully accessible within one electronic space, affected productivity: 'you're looking at a [paper] record and then you're flicking through different screens' (059).

The HIM-Coders' classificatory work was encumbered by organisational pressures for efficiency. For example, one senior HIM observed that '[t]here is not a lot of communication ... They sit and code ... their time is so precious' (078). Whilst some HIM-Coders frequently consulted with the doctors regarding the UR documentation, others engaged minimally and quietly classified 'as though ... under constant surveillance' (077).

Embedded classification

A future EHR 'must have a language and that's SNOMED' (055). The Australian version's (SNOMED-CT-AU) potential applications for complex inpatient classification presented challenges concerning its capabilities and development costs: 'Do we want it to be a reporting system ...? What do we want SNOMED to be?' (055). There was a need to work 'through a language barrier' (055) to bridge differences in approach between HIMs and IT specialists. Some HIMs felt that their expert knowledge was ignored: '[w]e can recommend what they do with regard to SNOMED-CT but they

don't always follow it' (041) and 'We [HIMs] do bring knowledge and expertise (055). A classification specialist acknowledged the indispensable 'human element':

[s]ome people think ... that you can just build clever algorithms which will take this SNOMED term, this SNOMED term ... put it all together and boom, out comes an ICD code ... There's ... still that human element ... if you're using ICD [as] a statistical classification, it still has to be that (056).

Casemix-based funding of hospitals

I heard Victoria[ns] say, 'We went from the basement to the penthouse' (062).

The reach of the financial imperative, and healthcare organisations' productivity expectations, permeated the HIMs' environments via the ABF hospital funding models in Victoria and, more recently, across Australia. The effect of casemix on HIMs' roles and the profiles of their HISs was transformational: 'It's very pivotal. The hospitals actually couldn't run without the information provided by the Health Information Manager ... And really, that's that' (012) and 'If the hospital wants to stay funded then you need to be nice to the Health Information Managers because they are the ones giving you the money' (018). Deep understandings of the ICD-10-AM and AR-DRG classifications, and high-level competence in practical coding, DRG assignment, coding-DRG auditing, analysis and reporting, and data submission to external authorities, were essential:

If you don't understand coding, you can't understand DRGs and grouping and what's going into it. And when you look at your performance compared to another hospital, if you don't understand the whole structure you can be quite wrong in [your advice] (009).

The private hospital sector

This sector's model, formulae and criteria emphasised: 'business and the bottom line and it's become more and more important with casemix funding' (058). The HIMs had:

... the knowledge that was needed to read the contracts and talk about DRGs and ... casemix ... This renaissance ... I remember coming [and] the [ward] staff just so effusive ... to me as a professional ... 'At last, we have someone who knows what they are doing ... who can give us the answers ... who can say to us "This is going to give you the money. This is not going to give you the money. And the reasons why"' ... Because, unfortunately, money is the imperative in the private sector (008).

The HIMs reviewed medical records, followed-up doctors' documentation inconsistencies, and focused on higher-paying DRGs: 'everything is financial, financial, financial. All of that [performance information] goes to the Exec on a weekly basis' (078). This intensive casemix role is explained in Box 6.

Box 6 Private hospital HIM

The HIMs in the private sector were: 'The knowledgebase for coding, DRGs, and quality' (008). 008 described the casemix environment as highly intense and time-critical. She daily examined inpatients' medical records and discussed each patient's condition with Nurse Unit Managers (NUMs) 'because the record at that point is still a work-in-progress because the patient's tests [results] are coming through'. The Visiting Medical Officers (VMOs) 'fly in and fly out'. Therefore, NUMs needed to 'know the importance of working with the Health Information Manager'. 008 would then:

code the patient accordingly, use the software available ... then look at the health fund [contract] for that patient ... work out the amount of money, work out a formula that each hospital has in relation to that amount of money and the number of days [reimbursement] that it will allow, share that with the Unit Manager (008).

The NUMs conveyed to their staff and doctors the financially optimal LOS for each patient 'and how we can [clinically] facilitate' (008) this. 008 then discussed, with the VMOs, their patients' LOS in the contexts of the diagnoses and procedures. This involved providing 'not unethical' advice: out of several diagnoses which, 'in all our best interests', should go down as Principal Diagnosis? 008's role reflected a wider tension necessitating a balancing of optimal care with the business-financial imperative. When calculating the patients' expected LOS based on diagnoses and other factors, and advising on the financial implications for the hospital: 'it's not just [the patients'] well-being, it really is a financial imperative for the hospital to survive' (008).

The work of private hospital HIMs, such as 008, was thus essential for their hospitals' operational and financial continuance.

The public sector

In Victorian hospitals, '[c]asemix was a driving force in bringing HIS really to the forefront' (009). Money was invested in HISs: 'because of the value of them' (009). Casemix forced data-driven, organisation-wide cultural and operational change: 'The whole structure of committees changed from being finance-driven to activity-driven' (009). This necessitated system, information flow and work process changes, and 'a much greater respect for the Health Information Service in regard to timelines and data collection and data quality [and] reliance ... for providing statistics for internal use [and] ... externally' (084). It reinforced the HIMs' long-standing engagement with systems and technology: 'You had to ... review all the systems [and] ... your coding process [and] ... support systems' (009).

Underpinning organisational viability

The Victorian public hospital HIMs (and increasingly, those in other states), and private hospital HIMs nationally, were continuously alert to their hospitals' revenue status and the effects of their classifying on organisational viability. The Victorian public hospital HIMs constantly analysed casemix and fed details on WIES consumption and projected revenues (e.g. according to clinical categories, units and programs) to hospitals' Executives and finance departments: '[we] look at it by surgeon, how many cases we have had, how much it is costing in WIES and how much we had back, how much the surgery has actually cost' (011). Treading a 'fine line' (016) to maximise revenues, yet avoid over-production, the HIMs aimed 'to optimise our WIES throughput, meet 100% target and then 2% beyond that. You can't be too efficient because [the hospital] could end up not getting paid for it [i.e. extra cases]' (016). The ABF model was projected to have 'huge implications' (058) for casemix-emergent states, which were at different stages of development. Solutions were neither simple nor fast: 'it takes years' (058). A senior HIM in a casemix-emergent state reported: 'we've just launched a [state-wide] audit ... looking at the admission criteria ... appropriateness of admission ... clinical support of that and documentation' (047).

The documentation-coding-casemix-quality nexus

Comprehensive clinical documentation was universally seen as pre-requisite to accurate classification, maximising hospitals' revenues, and underpinning clinical outcomes reporting. The HIMs educated doctors on 'casemix documentation [and] what that means in terms of funding' (063), and created documentation guidelines including on 'what we need, how important documentation is' (059).

Some participants undertook specialised casemix interpretive and developmental work to maintain the classifications nationally. For example 080, a content expert in 'patient information generally and particularly casemix and the business analysis' (080), provided input to the casemix, clinical, management and meaningfulness perspectives of the ICD-10-AM and AR-DRG classifications, and interpreted 'advice from a clinical group, I can translate that into [classificatory] meaning' (080).

Auditing

Internal auditing that monitored coding, DRG-grouping, and projected reimbursement was increasingly practiced in most states: 'It was sort of thrust upon us ... to be showing we were benchmarking' (054). Routine internal coding-DRG audits were embedded HIM practice in Victoria where the state's DoH monitored public hospitals' coding via a state-wide, external coding auditing program for financial and data governance. Hospital HIMs challenged external auditors' findings, e.g: 'We challenged a few of their decisions and we are still waiting on feedback ... it probably keeps people on their toes ... and it's an evil necessity' (017).

Coding and casemix auditing was ubiquitous. Health insurance funds had executed business decisions to move from the relatively simple hospital reimbursement method of *per diem* funding to the more complex episodic, DRG-based funding model that required: 'skills from HIM[s]' (063). The funds' HIMs audited private hospitals, selecting: 'a random sample of the hospitals ... on our DRG-base model' (018).

The last word on casemix, from a private hospital HIM: 'I am the money' (008).

Data integrity

Data quality was 'very important' (007). The HIMs knew intimately the data and the multiple reporting requirements:

We understand the data, the data collection ... And we understand what DoH's rules are ... we collect it this way because DoH wants us to do it because we submit the data so it all links in together ... IT were saying 'Why do you do it this way?' ... it's because ... the outcome of it is the quality data (011).

The HIMs were managing additional data processes in 'transition care, admissions, statistical admissions, and psych admissions ... we can control the data, the data integrity' (069). Their understanding of the data underpinned their advice to the Executive and clinical staff, expertise reliant partly on their being 'well versed in the input process and ... output process ... that sets us apart from [somebody] who just views it as data. We see it as a process' (012).

Standards

Data quality and standards were intertwined at all levels of the healthcare system. A government HIM who was deeply engaged with state-wide health datasets related: 'We do a lot of setting of standards ... on how we collect client information [from healthcare agencies]. We are very much involved in national standards' (013), making them 'accessible to non-data people' (013) to foster inter-sectoral data conformity and portability at state government level. This entailed working 'not just within-sector but across data types' (013).

Source of truth

Of central concern was establishment of the source of truth for all health data items: hospitals had 'different versions of the truth' (026) which 'we are trying to [streamline] ... so they can filter through me ... And then we can vet it ... and compare it to statutory reporting [data]' (026). Non-experts' interpretations of data sources and meanings were problematic, and:

tripped many a person up ... looking at your database from a non-clinical or [non-]HIM perspective and seeing ... 'reason for admission' ... interpreting that to mean a diagnosis ... And making decisions ... without referencing back to the people who are responsible ... The implications ... around resourcing .. like saying ... the majority of people, their reason for admission is [x disease] and therefore we need to spend more money on prevention ... when in fact the first reason for admission was not that diagnosis (084).

[The] Costings Team for [AHN] communicates a lot with me if they have any questions about the data but if they ... don't have any questions then I don't have any input ... That's ... a problem because we get into a meeting and I look at a report [and] can automatically see what the limitations are but they haven't actually documented those ... for other people to use when they interpret the data. [This] can sometimes mean [they are] actually saying things that aren't necessarily true because they don't quite understand the inputs and outputs (045).

Research

A core component of the HIM role, research was 'really important ... We have the knowledge ... of systems, of terminologies' (006). Commonplace in larger agencies, research was also central to epidemiological and clinical trials environments. In hospitals, the HIMs held 'the hospital's core dataset' (016) and many HISs maintained a dedicated database to enable complex interrogation of data for research, activity, and benchmarking purposes. The attached role could be: 'massive [involving] ... a lot of reports for the doctors' (083).

Career trajectory 3

Other HIMs undertook epidemiological research and clinical trials-related work, as seen in Box 7.

Box 7 Career trajectory 3

Epidemiological research, classification, informatics, and health information management

025's 19-year career was centred in clinical trials and epidemiological research. He joined a state-wide disease surveillance and study co-ordinating centre as a graduate HIM, undertaking specialist morphology classification and database management. Later, as Clinical Trials Database Manager, he constantly drew upon health information management skills including classification, retrieval, and abstraction of clinical data.

For example, in one study he had to match:

... the clinical data we had on ... over 200 patients, and a lot ... of the data were missing ... They were looking at the effect of chemotherapies on certain mutations and ... without a lot of the data the study just wouldn't have held up. It was a huge job finding [those] data (025).

He employed attention to detail, to ensure data quality:

[a] lot of people don't realise just how important the attention to detail [is] ... which I think HIMs [have]... It is definitely a skill and I was actually amazed at the acknowledgement and the appreciation [by clinician-researchers] (025).

025 moved to a clinically-based research centre as Study Co-ordinator. He managed trial subjects, data, and data quality. Later, as Clinical Trials Data Manager, he worked in the clinical team conducting multi-site, international trials. He conveyed data from bedside to research mode, meanwhile managing and protecting their integrity and privacy. Spending time in clinics, he captured data from patient-subjects at point-of-care. He collaborated closely with medical staff, researchers, other HIMs, and statisticians and observed that his work:

highlights the importance [of what HIMs do] ... Sometimes you think [because] they're clinicians they're doing the important work of patient care, but they do say that as far as the research side of things [goes], what we are doing is crucial (025).

Technologisation work

... you need to have the clinicians, the health information manager, and the technical person, because all three are the solution, and they all sit together (012).

Technology – in many guises – was seen by the HIMs as integral to their work. They conveyed little tolerance for technological determinism: 'technology should be supporting the business needs and information needs, not the other way around' (049).

The pace and extent of electronification of health information were variable, e.g: '[m]ost of the information is still hand-written notes or typed reports, even though all of the test results are now purely electronic' (016). There was cognisance of the need for a team approach and the HIMs were the interface, in a facilitating and negotiating role:

You need to have the clinical input to deliver what the clinician wants ... the technical people to enable you actually to deliver that, and ... you're almost like the interface between those people, to get the end result. The facilitator, the implementer, is how I would see it ... negotiator, as well (012).

When IT problems arose with systems or developments, 'you need to be on the spot to then say to the [IT] developers "This is not working ... We need to fix that bug" ... that's where we need Health Information Managers [who] are working in the [HIS] Department, and are involved in IT' (077).

The HIMs had engaged in technologies 'since the beginning of the computer systems for data collection' (084); e.g. 084's regional hospitals originally used batch processing and were 'sites for Beta testing ... It wasn't until a few years later that ... any hospitals ... had the equivalent of a computer ... the mid-70s' (084). In the late 1970s in one of Australia's largest tertiary hospitals, 'computerisation was just starting in terms of information systems ... just the Patient Master Index' (056). Subsequently, there was: 'a lot of change ... introducing different types of computer systems' (009), the PMI being followed by the 'ATD [Admission-Transfer-Discharge] systems and ... [medical record] bar-code tracking' (009).

The HIMs now continuously technologised throughout the healthcare system, e.g: developing and implementing PASs; ED 'system design and implementation, and maternity Birthing System implementation' (044); rolling out 'a clinical ... inpatient system' (027); and '... implementing the electronic medical record, I restructured it and created a structure ... a clinical application support' (057). 055 established policies, protocols and systems for primary care practices: 'It's pure HIM ... risk management ... putting systems in place' (055). One HIM described a year spent 'implementing the whole network-wide system' (007) for sub-acute and community services:

... setting-up ... figuring out how it was going to work and how it could be applied to ... the practical clinical processes ... You have got to understand what actually is done, day by day, within different departments. So there are different levels to it ... the very hands-on stuff, also trying to make sure that it is going to meet all the reporting requirements, gathering the right data and [ensuring] that it is going to be produced in the [required] format (007).

The HIMs also adopted new technologies in epidemiology and clinical trials, e.g. one clinical trials Database Manager had developed:

a pseudo clinical management system ... to meet the needs of ... staff within the Unit ... The HIM skills and background [have] enabled me ... to make a contribution ... that is invaluable to the Unit (028).

Leading the transition to the electronic environment

‘Technology [is current for] three years’ (057): in the knowledge that they inhabited a rapidly changing technological environment many senior HIMs, including the following Directors-HIS whose work is described in Boxes 8 and 9, voiced commitment to ‘a broader definition of systems and approaches, looking at workflows, and focusing on the data’ (049).

Box 8 Leading the transition (1)

049’s responsibility included HISs in 17 hospitals. Her brief incorporated:

... policy, strategy, governance, health information and records management for the [AHN], medico-legal, coding, casemix, audits, collection of data for KPIs, data governance, PAS [business aspects], linkage, standards, data definitions, code sets, policies and procedures, patient registration (049).

She re-oriented her HIM team: ‘We were well positioned to start to get these Health Information Managers who are focused on their paper to start to think about data, not paper ... in the electronic environment’ (049). The records were hybrid; therefore, her objective in transitioning to EHRs throughout the network was to lead her HIMs to a point where ‘they’d be thinking more in the [EHR] space across time ... over this we’ve had an electronic medical record being implemented’ (049). 049 encouraged her HIMs towards sustained engagement in the electronic developments, in collaboration with the IT staff.

Box 9 Leading the transition (2)

026, the Director-HIS in a specialist, tertiary hospital critiqued the efficacy of an internationally-known health IT system; her hospital was using some modules per DoH mandate: ‘I have seen [it], tried to implement it [in another country]. It is still not right’ (026). Previously, she worked for a health IT firm: ‘We usually find, having been on the other side ... [that] the HIMs do the functional things, not necessarily the technical ones’ (026). 026’s HIMs formally engaged with the hospital’s system implementations:

We are part of the team ... I have decided ... if [IT] need somebody to do [anything] ... they can have one of us ... if one [HIM] can’t be there ... [an]other can step in ... You need to be involved because it impacts [upon] our department so much (026).

She opined of the profession: ‘We are getting more techy’ (026), and observed that her hospital’s current IT project would not succeed without the HIMs’ input: ‘because we do tend to do all the system integration ... the testing, we are putting the HL7³⁹ identifiers against [system] because we know the back-end’ (026).

The HIMs were confident in their technology work:

... we do the job better than anyone else because we have got that specialised training. We have the ability ... to think through things really logically and in a detailed fashion ... we need to be seen to be the experts and the ‘can do’ people ... in any kind of information that deals with health (012).

The Patient Administration System

The PAS infrastructure was the core system in healthcare facilities. Typically developed with IT technical support, it was implemented and maintained by the HIMs who established independent back-up systems. Many participants had implemented several PASs and updates, e.g. in: ‘a community family health service’ (050), ‘a capital city hospital’ (046), and a regional network. They led collaborative preparations and decision-making, e.g. a Director-HIS chaired what had been: ‘an IT-driven committee that had users on it. And now ... users are on it and IT get invited along’ (015). Implementations were frequently imbued in organisational politics, as shown in Box 10.

Box 10 Politics and techno-social challenges

069 led the PAS design, implementation, testing, and staff training throughout a metropolitan AHN. Prior consultation with the HIMs had been negligible: ‘[t]he group who had selected the software didn’t even look at medical record tracking or any of the administrative core part of it’ (069). Planned to take one year, the implementation ‘lasted for two and a half [years]... We [AHN] were choosing a product no-one else had chosen before. It was really quite a naive experience’ (069). There were internal political undertones:

[a clinical] person ... was a very strong driver wanting to implement a clinical system, not realising that you had to have the backbone of the PAS behind it. So they chose this clinical system and then [we] had to build the PAS behind it (069).

In order to get the job done 069 collaborated with the software vendor’s representative, who was an HIM: ‘We worked very closely together designing it, testing it, because it didn’t exist at the start so we got to design what we wanted’ (069).

³⁹ International standards applied within the healthcare sector for the transfer between software applications of administrative and clinical data.

On being the 'in-between'

The HIMs undertook administrative and clinical systems work at the socio-technical interface; for instance, 050 worked on a real-time ambulance-to-ED system. Self-describing as the 'in-between', she mediated between technical staff, systems, and client-users: '... the technician would do the technical work but someone had to talk to the client ... we used to go with them to implement a system' (050).

The HIMs undertook business process re-engineering in change management to accommodate technologisation. The focus on health business analysis functions was informed by their knowledges of hospital, patient, information and clinical processes and flows, and their co-ordinating and project management skills, e.g:

... electronic orders and results reporting ... business process reviews to map out the current processes on how they actually go about the ordering ... get their results ... the issues ... with the process, what the future solution could be and how it would resolve XYZ problem and how it won't resolve another problem ... [I] had to pull people along a continuum to get them ready for an implementation (043).

Career trajectory 4

Many participants had worked, when new graduates, in a 'traditional' hospital role. Some, including 012, whose career progression is shown in Box 11, developed early interest in informatics and health ICT, and later focused on health software and systems development and implementation.

Box 11 Career trajectory 4

Health informatics, health information management, and classification

012's 17-year career traversed most domains of professional health information management. As a junior HIM in a tertiary hospital she coded, and managed a clerical team whose members retrieved and prepared medical records. She later became Deputy Casemix Manager and, subsequently, moved to another AHN's tertiary hospital:

... managing the Admissions Office ... Emergency Reception ... Waiting List staff, Theatre and Ward clerks ... their systems and staff reported through to me ... I was also responsible for the Patient Management System and training of new staff ... and also the Emergency Information System (012).

012 then undertook an IT project role, working 'on the [AHN's] contingency plan for patient information system redundancy'. There followed a 12-month secondment developing health systems and software for a

commercial IT firm. Afterwards, she returned to the AHN's tertiary hospital HIS as Data Manager for statutory data reporting. Later, she joined a national private hospital corporation as Business Analyst: 'responsible for 52 hospitals ... all of their business processes and implementation of change, and we did a lot of really large-scale projects around revenue cycles', financial maximisation and report standardisation.

She was:

the business brain ... behind electronic claiming, and rolled that out across 52 hospitals. I had a technical person [who] ... was responsible for the technical solution and I was responsible for the business solution (012).

Next, she became Clinical Analyst in another private health corporation's national risk program. She later re-joined the public sector: holding dual portfolios of Mental Health Information Manager and Data Manager in an AHN, she undertook staff and systems management, clinical system development and implementation, quality management, and statutory reporting.

This HIM and others dealt with technology options including wireless technology and devices for community-based, mobile clinicians for whom 'you really do need to have a portable solution' (012). This involved collaborating with clinicians and identifying ergonomic, occupational health and safety, information security, and vendor preparedness issues, and designing electronic form-templates: 'I've talked to most [of our] clinicians ... If they're having a home visit and interview they will document on paper and ... turn that documentation into an electronic note' (012).

The digital medical record

Digitised medical records were:

not electronic records. That's just a 21st century way of dealing with the storage problem but the electronic record is something completely different ... there is no writing ... no scanning, it's completely data entry, and the next step of embedded coding will be very different again ... There is a lot of work to be done (008).

Some participants had implemented an integrated scanning process that produced an inert, digitised medical record simultaneously accessible to multiple users. The hard-copy UR was hand-written and then scanned post-discharge or post-attendance. Other benefits of digitisation related to storage, e.g: '[w]e are out of space ... now storing off-site. It is costing a significant sum of money' (070), and reduced clerical establishments following elimination of labour-intensive retrieval, tracking and filing of records. As shown in Box 12, scanning was seen as a stepping stone

‘to an electronic record’ (009) or ‘to a full, true, electronic health system ... there will be electronic forms first’ (069).

Box 12 Digitisation: an example

Digitisation was part of one AHN’s electronic record strategy: a ‘10-year transition from paper to fully electronic’ (016); however, insufficient funding delayed the project for several years. The scanning system’s integration capacity enabled the importation of ‘electronic documents from ... outside or ... other departments’ (016). The digital medical record was designed internally to mimic the hard-copy UR, thereby to minimise disruption to clinicians’ work wrought by the change. Scanning constituted major technological change: ‘the biggest shift we have had since the current record system was started’ (016).

There won’t be a great impact on our [HIMs’ operational] roles other than we will have more to do with the scanning-IT system. The main impact will come on the clerical team ... we won’t be needing to retrieve ... and file hundreds of paper records [daily] (016).

There could be other benefits: ‘It will enhance the coding HIMs’ access to information and also the ability to perhaps work remotely’ (016) although, concerning the latter, the risk to privacy was unresolved.

The electronic health record

The HIMs took a very positive view of the transition to the EHR. Its time had come: ‘[t]he big issue is going from the paper record into the electronic era ... we’ve talked about this for 20 years ... And what we once felt to be impossible, now it is possible’ (017). Seen as integral to HIMs’ professional work, the EHR was ‘something that in the future will be there. And just the changing role that we have, with the knowledge we have of computer systems’ (011). They anticipated the effects of EHRs: ‘[o]ver time my [clerical staff] workforce from a Medical Records [Department] perspective would probably start to decrease once you hit a certain tipping point of electronic presence’ (043), precipitating elimination of clerical functions such as: ‘an hour looking for a medical record, [and] pulling records for clinics’ (026). Essentially, ‘the whole dynamic of the role and function will change to a bit more technical-focused or quality-focused’ (043). The hospital EHR was an elusive beast: at interview, none of the participants’ hospitals had full EHRs, although several were well-advanced. One state had a public hospital dual-strategy EHR, one component being a sharable, AHN-based system on which: ‘some Health Information Managers’ (049) were working.

Key issues and governance

The key issues were identified as technical (interoperability, system integration), privacy, and cost: 'it's really the interface, finding the money for that, that has delayed these' (009) and:

[i]t's electronic records and all the things that go with that. It's privacy, it's being able to track people, it's whether people should opt-in, opt-out, should you give people a choice, implied consent, all those issues (005).

The indisputable benefits were considered, alongside yet-to-be-resolved privacy challenges, by this Director-HIS in an AHN's large sub-acute facility:

When we do have a fully electronic record it will be fantastic ... Particularly in networks where there are multiple organisations with the patients moving backwards and forwards, the paper-based record is never where it needs to be ... the electronic record will bring its own challenges ... with privacy and security (007).

There were socio-technical, change management, and user acceptability considerations to be resolved, thereby to potentiate benefits for patient care and safety:

... a massive change management project for hospitals ... [about] having applications that clinicians are prepared to use ... I see enormous benefits for quality care and patient safety ... Whatever people can bring to the table, vendors, and skills of HIMs ... [it] is an important goal (048).

The Australian Government's policies on EHRs and, particularly, the personally-controlled national health record ('My Health Record'), were vital to hospital HIMs who wanted secure, interoperable systems for transmission of electronic discharge summaries to General Practitioners. Future medical record linkage would also require pre-emptive solutions to avoid privacy-related mistakes: '[the] thing that I worry about is the security and privacy' (055).

The HIMs formally scaffolded the EHR through governance structures:

You have got to have good governance around it ... systems and controls and ... audit[ing] who is accessing what, and where ... Because with a paper record one person can look at it, you usually track it out, you have ... got a feel for where the record has been but once it's electronic you won't have that (009).

Formalised bureaucratic processes supported the EHR's incremental introduction. These included management of the content of electronic forms and control of their proliferation: 'we have set it up now that any electronic form or changes to the electronic system have actually to come through the Health Information Management Committee just like any [paper] form' (009). At a different

level, the HIMs' development of health information governance policies and procedures concerned patient safety and quality of care. For instance, a hybrid medical record policy gave one AHN:

a sense of what's paper, what's electronic. And that gets updated regularly so that every time ... we get something that was in a paper-based environment and is now in an electronic environment ... the information is out there (070).

The profession still needed to convey what they, HIMs, could do in an EHR environment: 'It is getting the message across that Health Information Managers understand the process and control who views the record ... we have not had any of those conversations' (078).

Privacy, trust and the custodial role

The Health Information Managers are keepers of the information, you could say the protectors of information and the use of information (004).

The HIMs universally privileged their responsibility for the privacy of health information. Privacy-related problems were broadly divisible into internal breaches by staff and, externally, requests for and legitimate release of health information. The HIMs usually held the organisation-wide Privacy and Freedom of Information Officer roles: '[w]e are listed as the Privacy Officers' (059); '[i]n most facilities I've worked at I've also been the Privacy Officer. I'm the decision-maker' (058). Demand was increasing as 'there are more people ... wanting to look at the record ... Everybody comes to us if they're seeking advice about that' (017). Bound by legislative strictures, it required decisions about what information to release, when and to whom to release it, and when and with whom to consult. It necessitated 'staff education, policy writing, advice [giving]' (015), time-critical responses to (sometimes high) volumes of requests, and '[dealing] with health information when people request [it] so we have to [read] through that and make sure that nothing is released that shouldn't be released' (005). In mental health, 'that's a big concern' (005).

These, and the clinical trials role, were the only ones identified in the current research where HIMs had direct dealings with patients or their families. Additional to the matter at hand, the patients often wanted somebody in an official capacity to listen to them. In this context, the HIMs became the face of the organisation:

[This role] ... calls on your skills of compassion and empathy and diplomacy ... you could just pick up from someone ... that they weren't happy with the care that they ... or their relative received ... They often just wanted someone to listen (069).

I have been exposed to people who are a bit traumatised and ... stressed about the fact that they believe there has been a breach of privacy ... [Privacy] is ... so vitally important (070).

We come across new challenges every single day ... What you release to who[m] ... Deceased patients are often the largest [category] ... the debate over wills. The family has split and they want to prove Mum or Dad had Alzheimer's ... those sorts of issues. Lots of subpoenas ... families wanting access to notes (077).

There were elements of privacy policy-making and advisories in most HIMs' work throughout the healthcare system. Those in healthcare agencies developed information and management infrastructures to accommodate the seemingly conflicting requirements to protect privacy and facilitate legitimate access: '[w]e have very strict privacy guidelines on what can be sent to who, and when' (016). The localness of community warranted rigorous policies and organisation-wide staff education: 'I always say to people "[regional city] is [like] a small town and ... someone always knows someone [who] knows someone. That's why you have to be really careful"' (053). In the health insurance industry, the HIMs advised funds on privacy policies, legislative compliance and data usage, 'making sure that that's all done within the requirements of the Act[s]' (019). Management of the organisational privacy function was time-intensive: 'there's usually an investigation running' (043). Formal audit tools to identify staff members' non-legitimate access to patient information effectively put 'an audit in place ... show[ing] every single keystroke that someone's done ... making it very transparent (012). This was not always straight-forward:

We don't want ... a system that is ... stopping people from providing care ... We try to strike a balance ... We've got full audit capabilities so when people are picked up ... they might not actively [be] looking at the patient but it's an interesting case. They [clinicians] might just see that as a learning opportunity and not realise they're actually breaching privacy ... Mostly it's not malicious breaches ... just people well-intentioned but it's still a breach (043).

Impacts of changing technologies

Inappropriate use of technologies generated multiple privacy problems, such as when clinicians printed hard copies of electronically-available information or photographed patients on personal mobile 'phones: '[w]e have been trying to ... stop them from printing [on wards] ... It's not good for privacy' (077), and '[w]e've had medico-legal requests where the patient has said, "There's photos." And we've got no record [in the UR] of any photos ... Technology has ... made our job more difficult' (053).

Some HIMs operated in a wider arena; for instance, a nation-wide database containing sensitive mortality information, sometimes of legitimate interest to the public and the media, necessitated significant policy, technical and administrative controls governing access. Conflicting needs of subjects' families and researchers presented dilemmas around consent to release of information, requiring a bureaucratic solution. Privacy protection was embedded in data release procedures: 'it is always de-identified data, so we release statistics to the media but never ... [other] details' (018).

Clinical Trials

The clinical trials HIMs' custodial role protected the privacy of enrolled patient-subjects' information. Myriad issues demanded attention, including the ethics and legality of sending identifiable information via the internet from data collection points to the trial body's server, managing data transfer from private to public sector organisations and from public hospital to private trials body, information-related consent, the reach of Ethics Committees' approvals, legislative waivers where research data were fully de-identified, and mechanisms for patient-subjects to opt-out if it emerged that identifiable information might be transmitted.

Bureaucratic solutions were sometimes feasible, but 'transparent discussion of some issues' (028) was needed in an environment where some clinicians 'just want results ... and [do] not necessarily take into consideration ... privacy issues' (028). There was the dilemma of protecting the privacy of each patient-subject's information whilst balancing clinician-researchers' preferences for sharing and data linkage that would likely breach the subjects' or their family members' privacy. The HIMs filtered certain data items, restricted access to the database back-end and simultaneously met clinician-researchers' needs whilst protecting the subjects' right to privacy, by asserting:

'I don't agree with this ... the right way to do it is to provide an extract of data items from the database to you on a regular basis' and [withstanding] the pressure of 'Well we want everything' (028).

This HIM role demanded comprehensive knowledge of privacy legislation and regulations applicable to clinical research environments. The research HIMs needed: 'to show a degree of responsibility and educate the clinicians [on] their responsibilities ... as a custodian of the data you are constantly asked for information, which is part of improving clinical care' (025).

Controlling the data

Healthcare facilities' HIMs provided information to external agencies 'with patient consent ... [and we are] constantly receiving subpoenas to provide records and information including digital images to courts, tribunals' (016), and 'requests from solicitors for Worker's Comp[ensation] cases' (059). The volume of requests and associated procedures, screening, and payments for copies precipitated a view that health information was becoming commodified: '[h]ealth information is virtually a product these days. So we have to tightly control how we collect it, use it and disclose it' (016).

Quality management

The notion of quality permeated the HIMs' work. The portfolio for each HIS's quality management program was held by an HIM charged with preparing auditing, benchmarking, statistical and accreditation-related data. Those HIMs in small healthcare facilities were often also the organisation-wide Quality Manager. For instance, this applied to 063 who later became Clinical Indicator Co-ordinator for an '[AHN's] three acute care hospitals ... doing a lot of work [on] what sort of clinical KPIs we could use and ... using the DoH KPIs' (063).

Auditing of health information was embedded in HIMs' core professional work. One state government's report on quality of care had propelled development of a network's clinical documentation policy incorporating 'audit requirements and audit criteria and ... on a very practical level now it is about getting those audits to happen' (070).

Effective use of coded data for quality management and clinical governance relied partly on the structure and foci of the extant KPIs. Coded data, embedded in hospitals' financial arrangements, were being used more extensively in clinical audits, and for measuring and monitoring quality of care:

Whilst we have lots of KPIs, [many] aren't the quality-focused KPIs so we are trying to look at whether we can use our coding ... also ... for clinical audit, that's ... becoming more and more important (009).

Non-HIMs' lack of awareness of the complexities of the coded data led to erroneous conclusions or missed opportunities in clinical governance as seen in discrepancies in some hospitals between the

Clinical Governance Units' statistics on pressure ulcers and the coded data prepared by HIMs for statutory reporting, e.g. there were 'completely different results than if you did a prevalence survey' (009). The key, related 062, was in understanding (the genesis of) the comparative data and knowing how to interpret them.

The professional Health Information Manager

We, the Health Information Managers, are the bridging, what I call the bridges between admin, clinical and IT. We sort of build those bridges to make life easier for everyone (004).

Bridging the interface

A recurring theme involved the HIMs as bridge, 'a communication tool' (045), or connecting point, consistent with the previously described 'in-between' (050). Aligned to stability, they were 'an anchor, and maybe an interface is a good word' (015).

We are the business analysts ... and that's where we sit quite uniquely because we understand the information. We understand how it gets into the system. We understand how to get it out so it means something ... rather than your IT professional where you've this set of technical skills but you don't actually have the people management, the data management, that kind of knowledge (012).

This bridging role was seen across the landscape of health information management. In healthcare agencies, HIMs communicated with the clinicians and others who used the data 'so that I can make sure that they're interpreting those data properly' (045). At the technical interface, they routinely undertook IT problem-solving:

[IT Department] ... maintain[s] the programs, making sure the hardware all works, the software is running on time, but if there's a complication ... a record gets corrupted or there are any problems with the software, the data - it comes to me ... If I can't sort it out I then send it to the software supplier ... [IT] would like to step back from being involved in day-to-day problems and patient information. They see themselves as just making sure the systems all work together ... But we ... as HIMs, identify problems with how the software [or] ... the interface is working. We do a lot of problem-solving (011).

The HIMs perceived their knowledgebase and mobility to be advantageous because 'health is a complex environment and the more strings to the bow you have the more attractive you become to prospective employers' (043). They were acutely aware of their capacity to inform EHRs, and future standard terminologies and embedded classifications. Some saw opportunities, e.g. in visibilising 'casemix funding issues nationally and raising of our profile [to] bring the skill-sets of these

individuals more to the fore [including] ... at NeHTA⁴⁰ ... [where HIMs] can just input some of this intangible knowledge' (051). Elsewhere, HIM-classification software specialists interfaced between HIM-Coders in hospitals (expert users), hospitals (purchasers), and IT programmers, and also interacted with state DoHs and health IT vendor companies: 'part of my role ... [is] feeding all that information to the developers ... doing all the specs for all the changes for the software ... the programmers work from whatever we have specced out' (048).

'I am the resource person'

This was one of the most frequently occurring self-descriptors, irrespective of workplace. The HIMs' cognisance of their professional capabilities reinforced their contributions to the wider organisation:

This gives us a good platform ... the GM [General Manager] can contact my position if he's got an administrative problem anywhere in the organisation ... it makes the organisation smaller and more portable ... I can leverage more on my health information management skills (043).

They quite often ... want information about 'How long do we keep medical records?' ... privacy issues ... Freedom of Information ... the Medical Director relies quite a lot on my knowledge ... bounce[s] things off me ... if there are [patient] complaints I quite often hear about that because it might involve the medical record (011).

Invisibility

Notwithstanding their interface positioning, the HIMs' (mostly) behind-the-scenes environment was seen to contribute to a wider lack of understanding of their capabilities and work, generating a disequilibrium:

It is under-rated. I don't think many people within the hospital ... have any idea about the knowledge and the data and information that Health Information Managers actually have at their fingertips ... no idea of the research or the statistics that could be pulled out ... by speaking to the right person (018).

Meanings of the medical record and health information

The HIMs conveyed a sense that the medical record embodied the patient: 'this [medical record] is the patient, and we are just the custodian' (008), and '[i]t's not a bunch of paper. It's a person. It's someone's Mum. It's someone's Dad' (070).

⁴⁰ NeHTA: 'National Electronic Health Transition Authority', later re-titled the 'Australian Digital Health Agency'.

The HIMs' perspective of health information was widely-encompassing: '... the information is the glue across the system ... the information being ... the golden thread across the system that weaves it all together' (046). The primary use of the record occurred within the clinicians' realm 'to provide care' (044), whereas its secondary uses were 'around service evaluation, monitoring, and to inform service planning ... That's the health information management side' (040). The medical record was seen as a powerful instrument: 'people who are caring for patients ... need information in order to make the right decisions' (070). Its informational content empowered the custodian: '[w]hen records don't arrive at the theatre, on occasion, the surgery is cancelled ... it's a negative power ... that we hold' (015), seen also as: in: '... If you have got information you are informed ... in a very powerful position' (070). A more substantial power resided elsewhere in HIM' work, the *quid pro quo* being that they needed to 'promote it and champion it' (009):

... in terms of coding [and] the broad skills that they can bring and their knowledge, it's change management, it's managing staff ... data analysis, looking at the data, being able to interpret it, pick-up something that has been published 'that doesn't add up' ... enormous power for HIMs if they take it on board (009).

Improved understanding by others of the HIMs' capacity to undertake analytical, bureaucratic and standardisation work meant that in some places this was highly valued:

[i]t is extremely powerful ... as opposed to when I started [it was] just about filing ... and storing the paper. And ... episode-based funding is ... an issue and people are focusing on coding quality and documentation quality. People come to us a lot more ... There is an improved perception of ... the value of what we do (070).

HIS is fairly well respected here. We ... sit on all the senior committees. If there is any work to be done on new services, new technologies ... We are currently going through reviews with [DoH] on specified grants, I am co-ordinating those. I work very closely with my Executive Director (009).

In casemix funding environments the HIMs' time and advice were in demand by medical staff:

... all our [clinical] units want meetings ... those that don't [have them], want them, and those that have got them don't want to give it up to ... another unit. So it's [clinical units] competing for [HIM] resources all the time (009).

Aggregated health information was powerful at national level. Applications that began as 'data which starts off with the patient's contact within the health organisation' were 'becoming broader and broader' (017). This extended to national collections that benefited the society, such as HIM-coded cause-of-death data that could identify risky consumer products and prevent future deaths: '[i]t's only with information that we can do that' (018).

Domains of knowledge

The findings pointed to four core, intersecting and interdependent domains of HIMs' knowledge and work, as seen in Table 4: health information management; health ICT and informatics; health classification; and health data analysis and epidemiological research. Health informatics infiltrated or supported all health information management work, as did health information science which included expertise in health data collection, management, privacy, and integrity processes.

Table 4 Domains of HIMs' knowledge and work

Domain	The work involved
Health information management	Health information science-based systems; health data collection, governance, and reporting; health business management; and ethico-legal, privacy, quality, financial, strategic, and human resource management.
Health information and communications technology and informatics ⁴¹	Software and system development and implementation; administrative and clinical decision-support; information management; and clinical database management.
Health classification	Health classification; clinical coding auditing; and casemix-related work ⁴² .
Health data analysis and epidemiological research	Health data analysis; epidemiology; research; clinical trials; and clinical registry work.

The domains were absent mutual exclusivity and their boundaries porous. Work in any one domain required knowledge and skills from one or more of the other domains. The HIMs' career trajectories revealed flexibility and capacity for between-domain movement, although the expert nature of the work meant that some participants preferred to specialise in one domain. Many respondents had engaged in at least two or three domains in their careers: '... that is probably what makes it interesting ... specialising in a sense in so many different areas' (017).

Having examined what it is that Australia's HIMs do, and as intimated at the beginning of this chapter, we now move to a discussion of the key discourses in health information management that emerged from participants' perspectives conveyed in these in-depth interviews.

⁴¹ Health informatics permeated all domains.

⁴² Casemix-related work also includes associated data analysis.

Discourses in health information management

The HIMs in this nationwide cohort related some dominant, general discourses in Australian health information management: the profession's likely future direction; areas of major change (technology, data, privacy, funding, and the importance of the 'human element') and the HIMs' need for adaptation; and the profession's self-advocacy.

Future direction

Generally, optimism framed discussions of the profession's future: 'I can't see a future without it, it's impossible' (043). The HIMs envisaged an increasing 'advisory role' (006): '[w]e will always manage and ... oversee things' (013), and 'there are always going to be quality people needed ... systems people needed, business analysts. So getting away from the paper, it'll be a challenge' (005).

Anticipated areas of major change

Technology would 'totally revolutionise [health information] and the practices in the hospital, the work, the type of work for the profession, and for the staff, and for the patient' (014) and 'our role will change dramatically' (005). The 'move to electronic records' (005) was perceived as the most important contemporary issue for the profession. There was readiness for rapid change 'but you can only go as far as the technology allows' (043). Some HIMs were more nuanced: 'it can become more extensive, or broader and I see a lot of liaison with IT, with systems' (011) and 'emerging directions particularly in data management and IT' (007). The HIMs would continue to '[be] involved with ... IT vendors' (007) and health software development 'because a software developer, no matter who it is, needs to understand what that software needs to do' (015). There was an emphasis on data and predictions of increased focus on 'data standards ... use [and] ... manipulation of data' (013), and an increased 'data integrity role' (005):

One of the trends has also been involvement of the cross-over between information management and informatics and systems ... And is it not exactly the kind of thing we would want to do, to define and categorise it? (013).

Health information privacy was identified as presenting ongoing challenges: 'the privacy related issues will become even more [prevalent], legislation is becoming more complex ... the medico-legal

focus is going to be very, very difficult to navigate' (043) and 'there are definitely issues ... [around] privacy and confidentiality' (025).

Increasing HIM involvements in ABF models were anticipated because of: 'interest in the cost weights and DRGs and funding' (054). Similarly, increasing involvement was expected in the ubiquitous classification and categorisation, because 'there will still be those coding roles' (084). With regard to the further technologisation and automation of classification, there was a view that whilst 'SNOMED-CT[-AU] may be able to code the record' (005) the human element would remain essential.

Finally, there was an acknowledged need to adapt in order collectively to retain responsibility for all health information: 'your skill-sets do have to change ... As an HIM I like it going more electronic as long as that [organisation-wide] information, you don't lose it along the way' (026).

Advocacy

... we still are the strongest, the most specialised within the field and I think we have an opportunity to be the driver of the change, not coming along for the ride (046).

Notwithstanding widespread acknowledgement by their organisation's Executives, the HIMs expressed a need for increased professional visibility and to 'get it out there that we exist ... are not just a storage device. That we do other things' (069):

[a] lot of people even within the hospital, apart from senior staff ... still think we file medical records. (Laughter). They don't understand, but when they have a need ... they come down and they want information. They are astounded at what we do and ... what we can provide. And we can be that resource (011).

That's one of the tensions, that we are ... so useful in many areas. We have to be able to work with others and sell our principles and our ethics and the importance of good quality health information that is timely and fit-for-use (013).

Chapter summary

This chapter has revealed that the need for hospital HISs to occupy basement locations that support the weight of paper medical records has been ameliorated by the uptake of medical record-related technologies. The HIMs considered technology – in various guises, including classification – to be integral to their work and future. They welcomed EHR developments and

many senior HIMs were strategically preparing their professional staff for greater IT involvements. Expressing confidence in their technologising, some participants who formally engaged with their organisation's ICT projects, and system implementations and management, conveyed the need for their colleague HIMs to keep abreast of the latest health ICT developments.

The work of many HIMs was acknowledged and highly valued by their hospitals' Executives, and by supervisors and colleagues in research and health insurance organisations. In other environments, however, some experienced a lack of within-organisation understanding and recognition of their capabilities and work, sometimes by IT departments and, in under-developed activity-based funding environments, by clinicians. Cognisant of being under-utilised, these HIMs expressed concern for a need for increased professional visibility.

The HIMs engaged significantly in standardising work. They were focusing increasingly on data and standards, including at state and national levels. Their expert work in established casemix-based funding jurisdictions was intensive, reflecting its importance to healthcare facilities' financial survival.

Finally, the dominant professional discourses were the profession's: future direction in light of intensifying technologisation, standardisation, data integrity, and privacy concerns; preparation for this future; and (self-)advocacy. These and other interpretations, including the problem of invisibility and the challenges of the HIMs' increasing boundary spanning work, will be addressed in Chapter 8.

Chapter 6

Health Information Managers' work in an area health network

Introduction

In the previous chapter, I described the work of Health Information Managers in the Australian healthcare system. In this chapter, I re-focus the lens to take an ecological approach to the work of the HIMs in the complex, multi-institutional settings of a metropolitan area health network: The Royal Healthcare Network (hereinafter called The Royal). As foreshadowed in Chapter 4, the purpose of this component of the research was to examine the work of HIMs in an exemplar organisation that provided a wide range of patient care services. This network was chosen for study because the size and breadth of its services and casemix presented an environment that was likely to include a microcosm of HIMs' professional roles and relationships in the hospital and community-based health sectors.

In this investigation of health information management translation work within the environment of direct healthcare provision I have drawn upon Star and Griesemer's (1989) institutional ecology model, introduced in Chapter 3, to inform my observations. I have also used methodological considerations of boundary objects and boundary infrastructures as theorised by Bowker and Star (1999) and later refined by Star (2010); these concepts, also, were explained in Chapter 3.

Transforming mess into elegance

We have seen previously that Douglas (1966), Durkheim (1995), and Durkheim and Mauss (1963) described the dichotomy between the profane and the sacred, and between mess and elegance. It will become apparent as this chapter progresses that The Royal's HIMs inhabited the boundaries between mess and elegance, and the profane and the sacred. They captured, translated and transformed raw, 'untamed' health data into accurate, classified, organised and portable data and information. In the manner described by Smith (1990b), these became official facts. Thusly, the HIMs addressed the network's legal, clinical, governance, managerial and financial needs. Indeed, their work kept the network financially solvent.

Outline of this chapter

This is the second of three findings chapters. It begins with a description of The Royal's operations, followed by a profile of its HIMs and HIS. The second section details the HIMs' translation work,

described in Chapter 3 as the strategically negotiated production of core, coherent boundary objects. The final section summarises their development of other core boundary objects.

The institutional ecology model

Star and Griesemer's (1989) institutional ecology model was chosen as the frame of reference for this case study because it encapsulates the work of a complex institution whose participants occupied several different social worlds and engaged in standardised methods, classification, and the production of boundary objects. Their approach borrows, but is divergent, from the model of translations and *interessement* proffered by Callon (1986), Law (1986), and Latour (1987). One point of difference is that Star and Griesemer's modification incorporates an ecological analysis influenced by E.C. Hughes' (1971) ecology of institutions. In the current study this approach enabled an observation of different aspects of health information management throughout The Royal, thus mitigating the potential to take an anti-reductionist perspective such as by privileging certain participants' viewpoints over others.

In the context of this case study, Latour's observation on file and data custodial, classificatory and resource-generating activities situated health information management within the domain of scientific work. Characterised by both heterogeneity and co-operation, scientific work requires the input of multiple and diverse actors and perspectives, and the collaborative establishment of what Star and Griesemer (1989) term 'common understandings' (p.387). These are pivotal to the collection and management of durable, reliable information which 'maintains its integrity across time, space and local contingencies' (Star and Griesemer 1989, p.387).

The approach to this study of The Royal represents a slight deviation from Star and Griesemer's initial focus on the actors' translation work in different social worlds that, ultimately, produced boundary objects. Here, the point of departure is a collective of some of the boundary objects critical to the network. The case study describes how these objects were created and re-created via what Star and Griesemer (1989) describe as 'obligatory points of passage ... negotiated with several kinds of allies, including manager-to-manager types' (p.390).

'Naming' the HIMs

The HIMs featuring in Chapter 5 were from different organisations across Australia and each was described by a participant identification number. The Royal's HIMs collaborated mutually within one large network; in order to assist the reader more easily to identify and differentiate their translation outputs, they have been allocated pseudonyms in addition to identification numbers.

The Royal Healthcare Network

The organisations comprising The Royal were located within 500 square kilometres in one of Australia's largest state capital cities. Table 5 shows the network's five stand-alone facilities that delivered multiple healthcare services in this densely-populated catchment area.

Table 5 The Royal's facilities and health services

The Royal Hospital
An acute care hospital that provided tertiary-level general and specialist medicine and surgery, an Intensive Care Unit, specialist medical and surgical Outpatient Clinics, hospital-in-the home service, ED, and allied health services.
St Crispin's Hospital
A sub-acute, non-acute, and extended care hospital that delivered specialty and sub-specialty services in aged care and rehabilitation, including community-based and multi-disciplinary healthcare.
Happy Valley Health Service
A hospital that provided integrated care via general and specialised inpatient and ambulatory services, including community-based care.
The Willows Health Service
A day-procedure centre that also delivered medical, surgical and allied health ambulatory care services.
Riverside Health Service
An ambulatory care facility that provided sub-acute, non-acute, and primary healthcare services.

Profile of the Health Information Managers

There were 24 HIMs associated with the network-wide HIS including one seconded to the IT Department, and two based in the Mental Health Service which was shared with another network. Two other HIMs were in the network's Quality and Clinical Governance Unit. As Tess, HIM Operations-Acute Care, observed of the AHN's Executive: '... at [The Royal] they're very passionate about HIMs getting involved everywhere' (Tess, 031). Eighteen of these 24 HIMs were interviewed for this research.

The HIM establishment included five juniors whose experience ranged from one to 18 months. Some HIMs occupied extended, complex roles. Many undertook or had previously undertaken either of the 'contemporary traditional' or 'extended traditional' HIM roles described in Chapter 5. The traditional components of the role were highly regarded by several participants including Sal, the HIM-IT Applications:

... it's really important to work in a traditional role to start off with because I think that you have a really good understanding of the nuts and bolts of the hospital. How things hang together. [With] coding, you get a good idea of what patients go through (Sal, 034).

The Royal's HIMs had mixed (dual or multiple) portfolios: most had responsibility for classification and at least one specialist health information management portfolio.

Organisational positioning

The HIS was known as such throughout the network. To the Board of Directors and Executive, however, it was the Patient Data Management Service, a title that they considered to be more apposite. As Director-HIS, Jo (033) reported to the Executive Director-Finance within the corporate arm of the Executive's medical, nursing and corporate triumvirate. This organisational positioning had been seen positively by the HIMs. Tess (031) explained that:

[w]e [HIMs] all agreed ... our Executive Director got our opinions. We sit really closely with Finance and we have a really great relationship ... We decided that we would be known at the higher level as [Patient] Data Management.

Owning and managing the data

The HIMs enacted their health information managing across multiple boundaries throughout the network. Jen, the HIM-Data Manager (Health and Operational Informatics Unit) and (joint) Acting Coding Manager observed that throughout The Royal, the data and their management were: 'all owned by HIS' (Jen, 040) and:

All the data management and reporting [functions] are done by HIMs [...] We collect it, we manage it. We understand where the issues are. We know how to fix it. We know how to feed it back so that the issue gets dealt with. And we understand the data. And that's why it is easy giving a performance report to management because we can explain why (Jen, 040).

The analytical framework

The social worlds of the actors

Scientific work is always composed of members of different communities of practice

(Bowker and Star 1999, p.296).

The Royal's HIMs undertook co-operative work to manage the network's health information infrastructure and to produce health data and information, in formalised configurations, for multiple users situated internally and externally to the organisation. In order to produce and order the data, they had first to re-interpret and re-produce each patient into various data items and codified forms, and then analyse and report on these within temporal, diagnostic, financial, statistical, and other categorical orders and classificatory frames. These activities were undertaken in alliance with others who occupied what Star and Griesemer (1989) refer to as 'diverse intersecting social worlds' (p.388).

Table 6 (overleaf) illustrates the core boundary objects produced collectively by the HIMs' collaborative translation work. This is not an exhaustive rendering of each HIM's responsibilities as several also undertook staff management, committee work, system implementations, and myriad other functions. The focus here is on their translation work in intersecting social worlds. These boundary objects enabled The Royal to undertake its primary clinical and business functions of treating patients, justifying its claims for revenue, and complying with government reporting requirements. These boundary objects, as produced by each individual HIM, are shown separately in [Appendix 6](#).

The HIM social world

Locally, the HIMs collectively constituted their own 'social world' within which they collaborated in their specialist work. Lou (068), the HIM Operations-Ambulatory & Community Services, recalled her impression upon commencing at The Royal: '... we [HIMs] were all speaking the same language' (Lou, 068). She later observed that '... we tend to problem-solve really well as a team ... think outside the square' (Lou, 068). The HIM social world also featured incongruities, challenges, and differences in perspective reflected by each HIM in discharging his or her duties as a scientific actor.

Table 6 Boundary objects produced by the HIMs' translation work

- Accreditation: Corporate and Clinical Services; health information.
- *Ad hoc*, internal clinical, statistical, and financial reports: for Executive; network's clinicians, various departments and personnel.
- Audits and audit reports on clinical coding and coded data: for network Executive; HIMs.
- Audits: Sub-acute and Non-acute Program processes, and administrative and clinical documentation.
- Audit reports: for network Executive; internal to HIS.
- Australian Coding Benchmark Audit, and reports.
- Benchmarking (Health Roundtable) reports (network-wide).
- Casemix-financial reports: for Executive; Finance Department; HIS.
- Casemix, financial, clinical and statistical reports: for Board of Directors; Executive.
- Classification, DRGs, and documentation audits: for each clinical unit.
- Colorectal Clinical Database: maintenance, and reports for surgical unit and national body.
- Data and KPI reporting: Clinical Governance Framework: for Board of Directors; Executive; various clinical staff and departments.
- Diagnosis-Related Groups (DRGs).
- Disease and Operative Procedure Indices (Dataset); other classification outputs.
- Formal facilitation of medical record access for patients and others.
- Hospital-in-the-Home Program reports.
- Hospital Elective Surgery Waiting List: internal monitoring reports.
- Key Performance Indicator (KPI) reports on a range of hospital-wide performance measures: for Board of Directors; Executive.
- Mental Health Services: data and reports.
- Mortality and other clinical governance reports.
- Statutory Extracts: Acute Care; and related other external and internal reports.
- Statutory Extract: Casemix Sub-acute and Non-acute System; internal reports.
- Statutory Extracts: (State-wide) Inpatient Morbidity Database (SIMD); internal reports.
- Statutory Extract: (State-wide) Mental Health System (SMHS).
- Statutory Extracts: Non-Admitted Patient Data System (NPDS); related internal reports.
- Statutory Extract: (State-wide) Elective Surgery Reporting System (ESRS).
- Statutory Extracts and internal reports: (State-wide) Health Facility Reporting System (HFRS).
- Patient Administration System (PAS): upgrades; outputs.
- Digitised Medical Record (DMR) system: technical upgrades; outputs; audits.
- Medical record forms (paper-based and electronic).
- Reports to governments on multiple programs, e.g. Home and Community Care Program; Hospital Admission Risk Program.
- Processes: Referrals; Outpatient Clinic Waiting Lists.
- Privacy reports (network-wide).
- Quality and safety reports: for Board of Directors; Executive; clinicians and other personnel.
- Utilisation and Service Provision Reports: Sub-Acute and Non-acute Care; Continuing Care.

Other, intersecting social worlds

The HIMs' work was seen to be focused on ensuring 'the integrity of information in the presence of ... diversity' (Star and Griesemer 1989, p.388). In order to undertake this boundary work, they engaged in other social worlds. They occupied an intermediate position that spanned multiple boundaries throughout the organisation. They made and re-made alliances. Their work and

perspectives, described in the following sections, reflected the breadth of these alliances and their concomitant communications and negotiations with many internal- and external-to-the-network collaborators.

Translation work

Star and Griesemer (1989) observe that the ‘central cooperative task of social worlds which share the same space but different perspectives is the “translation” of each others’ perspectives’ (p.412). This case study reveals that, translating in this way, The Royal’s HIMs achieved their (and the network’s) objectives. They became what Star and Griesemer (1989) term ‘gatekeepers’ (p.389). The outcomes of their collaborative, negotiated translation work constituted ‘points of passage’ (p.390) and enabled further translation to underpin the creation and re-creation of boundary objects.

Boundary objects

As we saw in Chapter 3, boundary objects are shared. They are established ‘to maintain a common identity across sites ... [their creation and management being] a key process in developing and maintaining coherence across intersecting social worlds’ (Star and Griesemer 1989, p.393). The HIMs at The Royal established, maintained or used multiple boundary objects that were robust and adaptable to local needs and users. They both inhabited and satisfied the informational requirements of The Royal’s social worlds. The boundary objects included the pre-eminent UR, its components, and electronic, paper, and hybrid forms, and other core health information systems including databases, datasets, reports, statistics, financial equivalencies, specialist codes, and coded data.

Creating health information coherency

We live in a world where the battles and dramas between the formal and informal, the ill structured and the well-structured, the standardized and the wild, are being continuously fought

(Star 2010, p.614).

The leadership

Jo, the Director-HIS, was externally oriented in an environment of change. She focused principally on strategically directing The Royal’s health information infrastructure and management and, at the time of interview, was preparing for anticipated Commonwealth and state governments’ health

reforms: '[i]t is just this unknown with the health reform ... we all know where it is sort of headed, but what is the actual impact to organisations, to Health Information Managers in particular?' (Jo, 033).

Jo belonged to DoH state-wide IT and data committees. She observed that 'it is good to get yourself out there ... [and] ensure that we are involved and that we have a voice ... as an organisation, in these projects' (Jo, 033). These involvements enabled her to discern potential effects for the network and her HIMs: '... getting an understanding ... so you know how the implications could be for [The Royal]' (Jo, 033). Located in the network's Executive suite, Jo dealt in the social worlds of senior clinicians and managers, other heads of department, and her team of senior HIMs. She constantly sought improvements:

... it's about 'How can we make this [DMR] better? ... What functionality do we do so it's enhancing the product that we have got?' ... I am hoping to ... do that for all our areas (Jo, 033).

Developing new processes

Jo's intensive collaborations were exemplified in her implementation of '... a different approach to the way we fund inpatient admissions' (Jo, 033). This involved changes to level-of-government funding arrangements for certain surgical procedures undertaken at the Happy Valley Health Service. She engaged in calculation and negotiation externally with Commonwealth and State Government bureaucrats and internally with the Finance Department. She was embedding data systems to scaffold the new arrangement, and developing reporting processes for The Royal to meet its statutory and business obligations: '[h]ow do we submit that data to the Department [of Health] without attracting [CWAU⁴³]-funding but still have that activity reported? It's [about] working with the Department' (Jo, 033).

⁴³ Casemix Weighted Activity Unit (CWAU): a pseudonym that describes a generic (nation-wide) mechanism for a DRG cost weight based on an algorithm linking cost of care and treatment, the DRG, the amount due in revenue, and multiple other variables. This is similar to the previously mentioned Weighted Inlier-Equivalent (WIES) which, at the time of this study, is specific to the state of Victoria.

The source of truth

... what the HIMs do with data really facilitates decision-making across the hospital, in the way the hospital will be developed ... Even the way the government uses [State-wide Health Morbidity Database] ... health information is more important than it is probably given credit for because that is how they decide who gets how many beds (Sal, 034).

The concept of “one source of truth” permeated the culture of the HIS. The HIMs worked intensively to identify the source of truth for patient identification and data, and to reflect The Royal’s activity, care delivery, and other outcomes. Intent upon improving the network’s health information management business, Jo pondered, ‘[h]ow can we do things better ... in terms of service delivery [and] being able to provide ... an electronic medical record or an up-to-date medical record in whatever capacity?’ (Jo, 033) and system and process alignment for ‘... consistency across [The Royal’s] services’ (Jo, 033). The underpinning principle embodied ‘... one source of truth’ (Jo, 033). This necessitated ‘ensuring that people talk to each other’ (Jo, 033) and enter others’ social worlds.

The network’s Executive had agreed that the core PAS, managed by the HIMs, should be ‘... our source of truth’ for network-level administrative data (Lou, 068). The HIMs’ challenge was to get clinicians ‘to input the data directly into that system’ (Lou, 068). Lou related the need for the HIMs to negotiate in the allied health social world and to establish supports:

You can see from their point of view, ‘I am the clinician and I don’t have time to direct data-enter into a system’ ... So we are trying to find smart ways of collecting that information (Lou, 068).

Systemic errors

The HIMs held accountability for the data whose quality, however, was frequently contingent upon the capacity of others capably to undertake what Star (2010) calls ‘delegated work’ (p.607). Jen exemplified this through her ED referral data, as seen in Box 13.

Box 13 Data that 'go wrong'

That morning, the Head of ED queried with Jen the latest statistic for ED referrals to The Royal Hospital’s After-Hours Clinic: ‘[t]his is unusual for diversion data ... we have only got nine [referred] patients in the last week’ (Jen, 040). Jen commented:

... you go back into the system. You run a detailed report. You analyse the data and you look at the front- end of the system. The data are correct. But how the data are entered, you don’t know whether it is correct or not. Where are these [missing] patients? (Jen, 040).

The data appeared to be correct, or ‘... it could be processing, where patients who have been referred aren’t being captured ... [or] captured as being discharged home’ (Jen, 040), or a nurse may not have conveyed to the ED clerical staff that ‘[t]his patient has been referred to the After-Hours Clinic’ (Jen, 040). There was ‘... no way of back-tracking’ (Jen, 040) except via a time-consuming medical record audit. Jen elaborated:

People say ‘There must be something wrong with the data.’ But when you prove that it’s right you need to give them an idea ... where it could go wrong [...]. We get questioned all the time. Sometimes it is a miscommunication. And sometimes people don’t understand the data enough and how it has been collected. And maybe it is our responsibility to inform them better next time (Jen, 040).

The HIMs persistently mediated erroneous data, sanitising them into coherent truth. To this end, they developed bureaucratic processes and work-arounds to mitigate against the effects of human error in data entry and communications.

The source of truth for clinical governance

The importance of the “truth” also permeated the network. It underpinned clinical governance. The Royal’s Manager-Accreditation, Quality & Data KPIs, Pam (029), was an HIM. In her department, establishing the source of truth was ‘... a huge component and workload ... We don’t just use one data source’ (Pam, 029) including for presentations to the Board of Directors that reflected the network’s operations:

... from a patient safety perspective ... it covers all the big ticket items in terms of risk ... so that they can see and understand where things are sitting ... [The] actual work [undertaken] ... behind that is really significant (Pam, 029).

The rigour applied in producing coherent clinical governance reports was:

... something that [The Royal] has taken a lot of pride in ... We use our RiskMan[©] system, use our ICD-10 coding to [ascertain] what’s occurring there, and ... clinical audit, and meetings, to check that that’s correct (Pam, 029).

This work of drawing upon multiple sources was time-intensive. It necessitated extensive communications with staff from multiple social worlds by Pam and an HIM member of her team, Elle (030), the Coordinator-Quality, Safety and Risk (Medical and ICU Division). A deep understanding of health information was pre-requisite for the clinical governance role: ‘... health information ... you probably couldn’t recruit someone into my role without that background’ (Pam, 029). Similarly, a boundary-crossing perspective was needed when dealing with intersecting social

worlds: ‘... the HIMs are very good, if you’re talking of a clinical incident, of seeing that bigger picture’ (Pam, 029).

Initiating and managing technologies

Additional to their membership of the corporate, clinical governance and financial social worlds, the HIMs were ineluctably part of the IT social world. Their work was imbued in technologies: ‘... there are a lot of silo systems that capture information electronically’ (Jo, 033). Technology both enabled and complexified their work. Sal (034), HIM-IT Applications, appreciated the importance of coincidental work in different social worlds, and of re-negotiating meaning:

I find that I am a central point for all those people ... I get involved in almost everything now because I think HIMs are really good at communicating [...] how the business works and we are able ... to switch, so I can have a technical conversation and then explain it to a lay person in a way that they will understand (034).

Demonstrating adeptness in optimising engagement in the intersecting worlds, Sal focused first on ‘...knowing your audience, and that is often challenging’ (034). She found that different disciplines required different approaches: ‘Mental Health and Allied Health clinicians are really quite receptive. Whereas ... doctors, they’re so busy ... you try and tap in wherever you can’ (Sal, 034).

Limitations

The limitations of technology, including its slow pace of development, were problematic. Jo and several of her HIMs problem-solved to accommodate the IT infrastructural restrictions and this impeded their other work. There were positive features but yet-to-be resolved problems were compounded by multiple factors:

Technology is an issue ... the things that stop you from being able to move on ... it’s not an easy fix and now there are just too many factors or influences ... the concept is great that we are all on the same system ... but putting it into practice, it’s very challenging ... stops you from doing your day-to-day business (Jo, 033).

The lack of system interfacing was insidious: ‘[w]e are trying to figure out a way [to] interface [systems]’ (Lou, 068). The HIMs had proposed a Business Intelligence Unit to facilitate data reporting functions, including provision of critical information to clinicians. It needed ‘... an IT infrastructure that is supported, where all information just links in ... interfacing [the DMR] with all these other systems’ (Jo, 033).

Sal provided PAS technical support. Her secondment to the IT Department was intended to facilitate inter-departmental communications: '[s]he's ... involved in every meeting [about PAS] but ... no matter what meeting we go to, we are just constantly faced with these difficulties' (Tess, 031). Infrastructural limitations retarded performance and progress: 'IT infrastructure does stop you from [doing] a lot of things. And it is more time-consuming, the whole process of just following it up' (Jo, 033).

Technological problems

The HIMs had centralised data reporting requests. One of Jo's HIM-Data Managers was '... trying to run and create new reports and put them onto the system' (Jo, 033). Following successful testing, there had been production failure, '[s]o you're at a standstill, there is a back-up of ... reports ... that can't [be produced]' (Jo, 033). Systemic IT problems were preventing them from running standard reports on disease incidence; for example, the reports on pneumonia were '... inaccurate ... the coding has been all muddled up' (Tess, 031). Coded data had also been 'dropping off' the system. This necessitated re-work, including re-classification. After extensively investigating their data warehouse, the HIMs logged the problems with DoH's IT Unit. Tess related one response:

'Oh yes, we know about that issue. That happens at [two other networks]'. And we're like, 'Well why didn't you think to tell us? This has been going on since April' ... So it's constant ... they tell us there's a fix but then we never ever hear about when this fix is going to get put in (Tess, 031).

The HIMs would not '... hear for months' (Tess, 031) from the DoH's IT Unit. In absorbing the impact of poor government-mandated and -controlled IT systems, the HIMs mitigated against the problems through work-arounds: '... we have had to build these stupid backstops ... because of [DoH's IT Unit] ... being so incompetent' (Tess, 031). Compounding this were difficulties in being '... this middle person, it's just added this whole other level of difficulty and complication' (Tess, 031). There were persistent tensions with this external social world: '... the hill ... seems to be steeper now than what it ever was because of just the difficulties we face with [DoH's IT Unit] ... this constant battle' (Tess, 031).

Medical record forms

The Royal's UR existed in hybrid form comprising part hard-copy that was scanned, and part electronic (test and investigation results, and the – not widely used - eProgress Notes). The Royal's 3,000 electronic and hard-copy medical record forms, as boundary objects, collectively constituted and scaffolded the UR. A junior HIM, Jake (037), held the portfolio of Forms Co-ordinator; his work is described in Box 14.

Box 14 Form design

Jake undertook translations to design and achieve forms that traversed different passage points of user and committee approval, completion, implementation, and use. He inhabited the social worlds of the HIMs, Information Management Committee (chaired by Jo, Director-HIS), clinicians, IT Department (when developing a bar-coding program), Quality and Clinical Governance Unit, and The Royal's preferred printing firm. He operated in a contested terrain:

I'm the middle man (Laughter). And I'm always in battle with those guys ... I obviously liaise with the stakeholders here from the [clinical] units ... and the printer ... and I ... negotiate the pricing, the graphics design, the artwork costings, and ... get a consensus (Jake, 037).

Adhering to bureaucratic process without fear or favour, Jake negotiated to develop these standardised documents:

... making sure that everything on the form is legible. I don't just let people put whatever they want on the form. I make sure what should [and] should not be there ... that it's efficient and it ... does help the patient rather than hinder the treatment, and that everyone's happy (Jake, 037).

Sal, who previously held this portfolio, reflected on the importance of standardisation and alliances: '... a lot of meeting with the clinical staff ... to negotiate ... because people get quite defensive ... "That's my form and I use it for this purpose"' (Sal, 034). She had established working parties for effective communication. Requestors had to 'have an answer for why they needed it [form], so they were accountable for it' (034). She distanced herself from 'making clinical decisions ... so it was "You own the content. I own the design ... you have to approve what's written on it"' (Sal, 034).

Digitisation

The digitised medical record (DMR) facilitated simultaneous access to multiple users. As a coherent boundary object, it afforded The Royal and its patients benefits: '... it's better for the patients. Their

notes are available. You can have three people looking at one set of notes [simultaneously]' (Tess, 031).

DMR implementation

The DMR implementation had been intensely negotiated. Its adoption presented organisational risk as clinicians had to use two systems, and 'they have got ... three minutes to review the notes ... and they don't have time to talk to the patient' (Sal, 034). The HIMs were pragmatic about doctors' early adverse reactions; for instance, one ophthalmologist had complained "'Ugh, I don't like it. I am not going to use it.'" And funnily enough within three weeks, when [the DMR] had gone down, he was saying "Why isn't it up?" (Lou, 068).

The incursion of the new technological system into the doctors' world evoked strong reactions: '[w]e've had doctors scream at us initially' (Kat, 035). The HIMs mediated to gain user acceptance:

... It could be ... they just don't know how to use the system properly or it's a matter of retraining ... We were roaming around all the Outpatient clinics ... we made sure we trained them ... 90% of staff were very positive about it so it was just a matter of trying to get the 10% (Kat, 035).

The HIMs had immersed themselves in the doctors' and the DMR-technology social worlds to address the teething problems. These were usually health information science-related: '... housekeeping issues, something has gone into the wrong UR number or ... is overlapping' (Kat, 035). Concerned about the DMR's impact on clinicians' work practices, Sal worked to shape the system to suit users' requirements:

... they're not used to computers ... one clinician ... was very concerned because he used to have the paper here and be able to talk to the patient and now he has to turn, and he didn't like that ... when they've treated that way for ... 40 years, it's hard to change (Sal, 034).

She invited the vendor company's representatives to visit The Royal Hospital to hear doctors' concerns and preferences. As the in-between person oscillating between the HIM, doctor, nurse, allied health, IT and vendor worlds, Sal relayed users' experiences to the product vendor:

... we really want them to develop the product for the clinicians. Not the way they think we use it ... They're a bit removed from it ... it's our responsibility to feed back as much as we can to them (Sal, 034).

Digitising the record

The behind-the-scenes, technological and bureaucratic processes for digitisation were managed by a junior HIM, Jess (036). In this role, she reported to Kat (035), HIM Operations (Staff). Jess trained and managed clerical staff and risk-managed the functions. Her primary focus was '[t]o make sure ... there are no missing documents. It's ... about maintaining a good quality medical record' (Jess, 036). An error or omission in scanning even one page of a medical record could impede clinicians' informed decision-making and pose a risk to patient safety. It could also diminish the comprehensiveness of the coded data. The HIMs were alert to potential, system-generated clinical risk: '... if [the DMR] is unavailable we have a backup system but the backups are always 24 hours old. It's a risk for us' (Sal, 034).

Jess managed a DMR auditing program, randomly selecting 10% of each scanner-operator's work for audit. She addressed outcomes of less than 99% accuracy: '... we provide more training if necessary, pull them off the scanners if need be to provide more education' (Jess, 036). If the UR of a discharged patient arrived in the HIS containing a non-approved form, Jess first established its legitimacy and then its clinical relevance. She subsequently referred the form to Jake, enacting a bureaucratic, onomastic process involving the type of manager-to-manager alliance described by Star and Griesemer (1989) and referred to earlier in this chapter.

Statutory Extracts

Statutory Extracts were complex reports mandated by legislation or government guidelines. They were created by the HIMs from masses of tangled, raw, patient-related and service-activity data from throughout the organisation. The HIMs submitted the Statutory Extracts to governments, on behalf of The Royal. Late or non-submission would subject the network to financial penalties. These boundary objects formally reflected The Royal's patients, care, and services. In complex and lengthy processes, the HIMs obtained data from various sources, tamed and verified them, and compiled and submitted comprehensive reports of purified, formalised health data and information via Statutory Extracts. Their work in producing some of the Statutory Extracts is described in the following sections.

Awaiting surgery

The Elective Surgery Waiting List was the pathway to surgery for many patients. Gai (032), a junior HIM, managed this and reported via Statutory Extract to the DoH's state-wide Elective Surgery Reporting System (ESRS). She also produced *ad hoc* statistical reports for clinicians and managers. Gai acknowledged the hospital's culture and adhered to process: 'There's never a Cat[egory] 1 overdue in this place ... It's just not acceptable ... [Category] 2s and 3s ... we're working on getting those numbers down because they're just creeping up'⁴⁴ (Gai, 032). She operated in the social worlds of the HIMs, Operating Theatres, and the DoH's elective surgery dataset bureaucrats, and its IT Unit. She monitored hospital-initiated postponements daily, driven by the target of less than 8% overdue for surgery. Meeting end-of-month targets constituted an important passage point. Various factors affected the Waiting List:

... cancelled ... A surgeon can be unavailable ... sick ... Sometimes [patients] cancel themselves ... they're unwell or having a panic attack about the surgery ... patients in suspension periods [are] not counted as waiting, so once they [cease suspension] ... they could be on [the List] (Gai, 032).

Gai produced a daily report for The Royal Hospital and brought problems to the attention of the Operating Theatre managers:

I know that we're creeping up ... I am the one [who] looks at it every day ... [I say] 'Just to let you know...' I'm there to give them the data that's in the system, in a meaningful way (Gai, 032).

Technology

The IT problems associated with a system upgrade had '... done a few things funny with the Waiting List' (Gai, 032). This threatened Gai's capacity to complete timely, statutory reporting to the DoH: 'Why have I got pages and pages of errors ... to fix? ... "Well you're just going to have to work through them and hopefully you get them done in three days"' (Gai, 032). Any PAS-related problems associated with the Waiting List Statutory Extract necessitated Gai dealing with the social world of the DoH's IT Unit. This interfered with her desire to 'discipline' (Star and Griesemer 1989, p.404) the Waiting List data:

... you've got to go through these people at [DoH's IT Unit] who then contact [product vendor] to fix the problem. And I don't like this middle-man business. It is a very slow process ... weeks before they even look at it (Gai, 032).

⁴⁴ The categories are that state government's codes reflecting the severity and level of surgical urgency of a patient's condition.

Reporting morbidity data

Box 15 Reporting to the State-wide Inpatient Morbidity Database

Sue's (066) portfolio included preparation and timely submission of comprehensive inpatient data to the DoH's State-wide Inpatient Morbidity Database (SIMD). This report contained demographic, administrative and coded clinical data on every admitted episode at The Royal's campuses.

Sue's work was critically important: 'They [The Royal] wouldn't get paid. That's how we get our funding, through the [SIMD] with all the inpatient data' (Sue, 066).

For a year, Sue had been training junior HIM Tim (038) in the SIMD work which demanded attention to detail in standardised and recursive bureaucratic processes. There were challenges: '... a lot of our time is spent fixing errors in the patient management system and you need to be error free before you can submit the [data] file' (Tim, 038). Sue's deep understandings of data and system informed her continuous internal review. She focused on data integrity and regularly ran internal reports:

... to pick up errors with the quality of our data ... where things will reject ... also just combinations that I know wouldn't be correct. And so we fix the data to try and get really good quality (Sue, 066).

Errors and balancing

The DoH subsequently reported back to The Royal via:

... an extract, a big file ... and now you've got to balance and make sure everything's in that you want to be in ... And rarely does it balance. You've always got to work to keep things balanced (Tim, 038).

Sue and Tim explained in interviews that they meticulously verified details of all inpatient episodes of care, ensuring that all of the network's '... admissions, operations, bed-days, [CWAU] values, all balance. And also within Account Class, Care-Type, every Billing Class, drilling down so that everything balances to our [The Royal's] internal figures' (Sue, 066).

Translating

This calculative translation work necessitated Sue and Tim's engagement in the social worlds of Ward Clerks, HIMs, Finance and IT Departments and, externally, of the DoH's HIMs, other bureaucrats, and IT Unit. It involved several critical passage points: data entry; balancing of statistics; data submission; receipt of the DoH file; data correction, re-balancing and re-submission; and advising The Royal's Executive on projected revenues.

Sue also undertook classification, other analyses, and reporting to government on The Royal's Hospital-in-the-Home Program. Instrumental in the introduction and maintenance of the PAS, she was an expert on all data in the system: '... admissions, discharges, transfers, coding, casemix, extracts, tracking, all sort of main HIM stuff, PMI' (Sue, 066). Sue trained staff, wrote the user-manuals, and was confident in her technical knowledge:

I do 'get' [PAS] because I understand the back-end and the Reference Files ... [Implementation was] challenging because there were lots of ... software issues that had to go back to [product vendor] to be re-configured or just clarified ... a lot of it we just had to nut out for ourselves, just trying different combinations to see how it actually looked in the back-end (Sue, 066).

The finance social world

Sue and Tim's work necessarily involved them in the social world of The Royal's Finance Department. The financial imperative was at the forefront of their minds because '... our data does provide all the [CWAU] values so ... Finance know how they are going, how the hospital funding is working and are we in the [black] or the red' (Tim, 038).

In the social worlds of others

Communicating with PAS users throughout the network, Sue and Tim were drawn into others' social worlds. Sue was frequently approached by HIMs from other hospitals regarding PAS and data issues. Tim, the neophyte, was becoming a 'resource person when it comes to [PAS, SIMD]' (Tim, 038) and submitting the data:

... you learn not just the dataset but you learn [PAS] back-to-front as well, which is really important because I get 'phone calls ... 'This is happening in [PAS], how do I do this?' ... I get 'phone calls from people I don't know ... other hospitals ... 'Hey, we're having this trouble with our [SIMD]. Do you guys get this?' (Tim, 038).

Duplicative mental health reporting

Mental Health Information Manager, Cate (065), generated statutory (State-wide Mental Health System [SMHS]) and non-statutory reports for the Mental Health Services. The DoH captured '... a lot of their statistics ... hence [evidence for] funding' (Cate, 065) from the SMHS. These data were reported in duplicative processes via The Royal's systems and, separately, the mental health database. Technologies and government guidelines drove this anomalous arrangement: '... we

enter both onto the local hospital system and the State-wide Mental Health System [SMHS] ... it is double data entry' (Cate, 065).

Non-admitted and ambulatory care reporting

Closing the gaps

As HIM Operations-Ambulatory and Community Services, Lou (068) had carriage of health information systems and Statutory Extracts for The Royal's extensive ambulatory and community-based services. She also submitted data to the state-wide Non-Admitted Patient Data System (NPDS) and to the Health Facility Reporting System (HFRS). The mixed-source (Commonwealth and State) funding of the ambulatory-care services complexified the data processes. Lou perceived the HIM role as being '... about closing ... gaps' (Lou, 068) in health information throughout the continuum of care, and '... connecting the Ambulatory and Community [patients] and ... following their care through the Inpatient service' (Lou, 068). She improved and standardised the translation processes, ultimately to produce boundary objects that would withstand scrutiny of funding authorities' external audits:

... clinicians would just put their little notes on bits of paper [or] send us emails ... we thought 'We need to show a bit of accountability ... and if we are ever audited we are able to show ... the record of how we produced these numbers' (Lou, 068).

Lou was in negotiations with the allied health clinicians. Some were documenting into a database that the HIMs had developed internally. Some used other systems. Consequently, the HIMs were extracting data 'from all these different databases' (Jo, 033) and cleansing, reformatting, and reporting them to the DoH via the HFRS. Duplications occurred: 'Trying to standardise these is a nightmare' (Jo, 033). The HIMs had:

... produced [and] submitted data [showing] this many social work attendances and now we are saying for [following year] that it has decreased by 50%. Well, why the difference? ... it is because they [Social Workers] have changed where they are reporting but ... didn't tell the people who were extracting the data (Jo, 033).

This problem reflected different meanings ascribed to the data within the worlds of allied health and the HIMs. It highlighted the need for the HIMs to dialogise and negotiate with allies, in this case Social Workers. This communication was crucial, per Star and Griesemer's model, to enable the HIMs to translate the data for the Statutory Extracts. Absent interactions with the HIMs, the allied health clinicians would inevitably use the most convenient system in the busy outpatient

environment, a situation that reflected Bowker and Star's (1999) observation that 'standards do not remain for very long, and that one person's standard is another's confusion and mess' (p.293).

Technology issues

Lou constantly negotiated ways of helping clinicians to work more efficiently with clinical paperwork and data entry. Ideally, '... it would be great if everything could come out of [PAS]' (Jo, 033). The system's limitations were exacerbated by external forces, specifically the DoH IT Unit's tardy implementation, state-wide, which hindered desired change. Consequently, some community health data collection systems did not function optimally and The Royal's healthcare facilities were '... forced to remain with their silo systems' (Jo, 033), necessitating work-arounds.

Work-arounds

The production environment of these Statutory Extracts was characterised by heterogeneity and contestation. Like several of the other HIMs, Lou undertook work-arounds to collect the data and enable a coherent set of translations for reporting to governments: 'I have developed a level of knowledge and expertise that nobody [else] knows ... we have been able to build up that close relationship with the other key stakeholders in the hospital' (Lou, 068).

Whilst she focused on the 'continuity, clinical care side of things' (Lou, 068) and was concerned 'from a data perspective of how they can use it for research' (Lou, 068), Lou's primary foci were: '... funding, accountability, reporting' (Lou, 068). There were always demands for more and better quality data. Lou was attuned to the legitimate interests of other social worlds: '... this is the sort of information that Executive is now more and more interested in because the [DoH] is now interested in the ambulatory side of things' (Lou, 068). Her translational work included rectifying inconsistencies arising from non-standardised processes: 'That is where HIMs come in ... We are looking outside the square' (Lou, 068).

Continuing care data collection and reporting

The sub-acute and continuing care data collections, and their management and statutory reporting, are described in Boxes 16 and 17.

Box 16 Casemix Sub-acute and Non-acute System (CSNS), and Clinical Sub-acute Program data

Deb (039), the HIM Operations-Continuing Care for St Crispin's Hospital and Happy Valley Health Service, managed financial, clinical, and utilisation data including analysis and reporting for '... Continuing Care which [involves] the [Casemix Sub-acute and Non-acute System⁴⁵] reporting ... for rehab patients ... making sure we're maximising our funding ... and that all the procedures and processes that we do are spot-on' (Deb, 039). She audited the Clinical Sub-acute Program and clinical documentation to enhance efficiencies and revenues. Deb worked within the clinicians' social worlds to standardise documentation practices and processes, because '... the off-shoot ... is that there might be some financial implications' (Deb, 039).

Box 17 Continuing Care Service data

Ange (073) was the HIM-Continuing Care Service. Negotiating within different social worlds she elicited, translated and reported utilisation, service provision, and revenue justification data. In one facility, revenues were adversely affected owing to data being missed at point-of-care. It was Ange's role to liaise with nursing staff and Ward Clerks to effect change. A recent graduate, she found this challenging: 'I take it to the NUM[s] and they say "... it's not my job"' (Ange, 073). According to Star and Griesemer (1989), this confusion is typical in the management of multiple social world memberships.

Classification and DRGs

... basically, the hospital wouldn't be funded and wouldn't be running if it wasn't for [HIM-]Coders (Ros, 067).

The centrality of classification

The HIMs' production of coherent, coded data representing patients' diagnoses and operative procedures was arguably one of the most important functions in the whole of The Royal. They were constantly classifying for others and making sense of, and making portable, the data. Absent the coding artifice, there would be mess and confusion. Their classification work underpinned the network's perpetual dataset of coded diagnoses and procedures, and the DRGs and casemix analyses that defined financial values of cases treated. This work involved justification of revenues and statutory reporting compliance, and produced comprehensive coded clinical data for research and to inform clinical and business operations, governance, and planning.

⁴⁵ A pseudonym. This system underpins and reports activity-based funding for non-acute and sub-acute care and services, including: rehabilitation medicine; geriatric evaluation and management; and psychogeriatric, palliative, nursing home, convalescent, and respite care.

An essential skill

There was a strongly-held view that classification knowledge and skills were central to HIMs' professional practice. For Jess, classification was part of the essence of being an HIM:

... every HIM needs ... a part of coding in them. I don't think you could be an HIM without knowing ... how to code ... why we code or what we code. Because every HIM role [including] data ... needs coding because you're going to pull reports ... With IT you still are going to have to know coding because you are going to run ... or design a report ... [As] staff manager and HIM Operations Manager ... you can't manage someone if you don't know what they're doing or why they're doing it (Jess, 036).

Informed by 25 years of professional experience, Sue also saw classification as '... a skill that I think is essential to being an HIM' (Sue, 066).

Contestation in the classificatory world

The HIM-Coders' intense translation work was undertaken within their social world and also involved the worlds of doctors, the Executive, Finance Department, and the DoH.

Di, the Coding Educator, reported to the Coding Manager position. She classified, managed the Coding and Casemix Unit's professional development including continuous updating on the coding standards and rules, and supervised the junior HIMs' classificatory intern experience involving the breadth of The Royal's casemix. The HIM-Coders were '... constantly learning off each other' (Di, 074). Internally, they established performance standards, audited, and vigorously negotiated code selection: '... we are not scared to speak and say, "No, no. It has got to be like this." ... coding ... is not black and white' (Di, 074).

They privileged consultation: '... if there is a coding question the whole room gets involved' (Sal, 034). They met regularly to address classification issues and maintained an internal database for classificatory-documentation problems: '... if someone ... has a question ... that person knows to take that record to the doctor to ask' (Ros, 067). Ros, the Coding Auditor and (joint) Acting Coding Manager, co-ordinated a system of targeted queries. Sometimes, doctors omitted documenting a potentially codeable diagnosis:

... I'll run a query [report] for the Top 20 [DRGs] for their unit and see 'Oh that looks a bit funny. That person has been in for, say, 10 days over the average. We might have a look at that' ... I'll take that back to the doctors to see what is going on (Ros, 067).

Storifying the patient

The translation of patients into ICD-10-AM codes and DRGs involved the complex abstraction, coding, DRG grouping, and indexing processes described in Chapter 3. It also involved the storification of the patient, as related by Jake: ‘... the experience of putting everything in to a story, the condition the patient was admitted for, turning it into a medical story that’s actually readable and understandable ... I just enjoy it’ (Jake, 037). The intellectual satisfaction derived from the storification and the long processual trail of translating the patient into coherent boundary objects were reiterated by Jess:

... you get a story from start to finish ... I enjoy that, making a story out of it ... largely because it’s not only the coding ... it’s not like we get a record, we read it, we get a story out of that record and we code it and never see it again. We pull data from that ... we get the number of [e.g.] DVTs that arise or ... something out of what we are doing so ... research can be done, or audits ... it’s a continuing process (Jess, 036).

The financial social world

There was pressure to maximise The Royal’s revenues: ‘... the most important thing is ... your coding quality ... so you are generating the right [CWAU] output’ (Jen, 040). The senior HIMs, particularly the Coding and HIS Operations Managers, constantly monitored the financial targets and coding outputs. They provided analysed, official data to inform the network’s Executive: ‘[we] ... report the [SWAU], [e.g.] why we have a lower [CWAU] conversion this month’ (Jen, 040). This could result from various factors such as lower acuity, fewer or different categories of patients, reduced average length of stay, or:

... more discharges, more same-day ED-type of cases ... Besides the coding process you need to be aware of the implications ... to the organisation. And it is important, especially when dealing with Executive level, to be able to explain that to them (Jen, 040).

Clinical documentation challenges

Classification was essential for the HIMs to make sense of and portabilise the data. In order to achieve their objectives, they retained the doctors as allies. They conveyed the impact of documentation on classification, DRG grouping, and revenues: ‘[b]y improving the documentation, how that can affect the DRG’ (Di, 074). Documentation, however, was not the junior doctors’ priority: ‘[d]ocumentation comes second ... It’s hard to get them interested’ (Di, 074). Gai was allocated to a surgical unit:

... the Consultant comes [to the HIS] ... We write up the query, 'Your diagnosis says this but throughout the whole record it says this. Which one is it?' ... And they'll sit there with you ... confirm it and they sign-off on it and that way we can code that ... Otherwise they'll say 'No, it is that'. It's really up to them. We can't obviously be making those [diagnostic] decisions (Gai, 032).

The quality of coded data

Jen, the (joint) Acting Coding Manager, also held the portfolio of HIM-Data Manager. After identifying with doctors any missing diagnoses, she addressed the classificatory technical constraints:

Most of the time it is [about] capturing the code ... some things you don't code because it is incorporated in another code. Most of the time it is fine. And sometimes there is no code for it (Jen, 040).

Auditing

The HIMs' data purification included a coding and DRG internal auditing program, embedded in the HIS' quality management plan. The policy was to conduct monthly audits of at least 10% of each clinical unit's discharges:

As an auditor ... if something doesn't look right you will go in and actually check it and make sure that it gets coded correctly. Sometimes it could be a coding error, sometimes it is documentation error, so it is a quality process (Jen, 040).

Ros focused on auditing 'records that will make money' (Ros, 067). These were cases in the higher cost-weighted DRGs: '[t]he Top 10 or Top 20' (Ros, 067) from the financial perspective, because '[t]hat is what Finance are looking at' (Ros, 067). The HIMs had clawed-back several millions of dollars of additional revenue for The Royal in the previous year through audit-generated identification of clinical information that legitimately enhanced revenue. The value-adding they contributed to the business was recognised: '... our Executive Director is very passionate about coding ... he really sees the power of us and has a lot of respect for us' (Tess, 031).

This notion of power was expressed later by Sal who indicated that health information was '... very powerful' and the HIMs' management of health information also rendered them considerable power and accountability: '... for such a small profession we actually have a massive responsibility ... we're very, very important' (Sal, 034).

Clinical governance

The coded data were true boundary objects. In addition to their applications for population health, service planning, funding, and research, they were vital for clinical governance. Elle segued between the doctors' and the HIMs' social worlds, engaging in the latter to elicit data. For example, she investigated:

... the top 10 Principal Diagnoses and from that [whether patients] would [be] expect[ed] to die ... we did a really detailed audit around all the patients ... with a Principal Diagnosis of Sepsis [who] died. What was the timing to antibiotics? What was the sensitivity to the organism? (Elle, 030).

The outcomes enabled doctors in the ED and medical wards to identify practice improvements as '... only 60% of those patients were getting their IV antibiotics within four hours' (Elle, 030).

Uses of coded data

Inevitably, the classification process supported a great deal more than funding:

... It is about data collection. It is about statistics. You can do a lot of things with data. Every bit can tell a story ... It is good for research ... 'I want to know how many people had this procedure in the last two years', 'I want to know what services can we put in place' or '... I can put on another doctor if the demand is there ... [for] these ... procedures'. And ... to analyse the trends of ... activities (Jen, 040).

Correct interpretation was essential. Some participants commented that non-HIMs misinterpreted the data, causing problems: '[i]t's not just coding. We've obviously got the financial side of it' (Pam, 029) and '[i]f you don't have that knowledge of how it has been collected it can ... impact on how you interpret it' (Jen, 040).

Ongoing issues

The translation of coded data from mess into the elegance of a usable report for researchers was sometimes frustrated by system redundancy created by changing technologies over time. Jen managed *ad hoc* requests and reporting for clinicians: '[w]e have a little discussion with them about what they ... are trying to achieve, and what we can do to ... help them' (Jen, 040). Longitudinal changes to coding standards and practices sometimes thwarted case identification: '[i]f we are retrieving a type of procedure over a range of years then we are likely to need to go back to [previous versions of the classification]' (Jen, 040).

Other translation work

The HIMs tamed and translated myriad other health data to create coherent, purified boundary objects for The Royal. The following descriptions exemplify some of those undertaken well after the patients had received their treatment.

Colorectal research

Ange's other portfolio, Colorectal Service Administrator and Research Co-ordinator, situated her in the colorectal carcinoma specialists' social world: she traversed what Bowker and Star (1999) refer to as the 'borderlands' (p.305), specifically the interdisciplinary borderlands of HIM and colorectal surgery. Ange negotiated with doctors for completed documentation: '... I have to chase up ... the Registrar and the interns to fill out every single thing' (Ange, 073). Ange transformed and reported on surgical data for research, shepherding these through local passage points and to a national database.

Release of information

Kat (035) and another HIM (not interviewed) co-managed the Freedom of Information and Privacy Officer portfolios. Governed by legislation, Kat determined what information was released to patients. In this capacity, she reported to The Royal's Chief Executive Officer (CEO) and inhabited the social worlds of patients and other external requestors, doctors, HIMs, and clinical governance and clerical support staff.

Gatekeeping, traversing social worlds, and other aspects

The gatekeeper role

The aforementioned examples reflected the HIMs' behind-the-scenes gatekeeper roles. This case study reveals that The Royal's HIMs became what Star and Griesemer (1989) term 'gatekeepers' (p.389) in order to achieve their (and the network's) objectives. We recall that these enabled 'an obligatory point of passage' (p.390) in purifying data and (re-)constructing truth. One junior HIM observed that, without the HIMs, The Royal would '... be a bit lost ... they wouldn't have the information in a useful way' (Gai, 032). Essentially, '... if you want to know anything of any

importance, it needs to be ... interpreted in a way that can be understood by everyone and ... we help do that' (Gai, 032).

Traversing social worlds

As Jen (040) observed, '[i]t is not just about clinical care. It is about the things that support clinical care'. The HIMs were part of '... the entire organisation some way or another ... we are pretty much in, whatever way ... every department' (Jo, 033). They had '... that over-picture of what goes [in]to a whole patient stay ... We've always seen that bigger picture' (Pam, 029). To an extent, the passage points framed their translation and data purification. Their flexible, hidden conversions of mess into order rendered them '... very important ... we have a lot of hats ... we are invaluable in hospitals' (Kat, 035). Jake asserted that they were:

... probably the most important professionals, apart from the doctors and the surgeons, in the organisation. We get the funding for the hospital. We do all the reporting. We liaise with the various government departments in terms of [data] ... without a Health Information Service ... the hospital could not function (Jake, 037).

Enabling coherence

In enabling coherence, the HIMs communicated extensively including via formal structures. Tess saw this as an omnipresence: '... every single meeting that happens at the network, there's an HIM representative somewhere. So we really do have a say ... They respect us and our coding [and] all the other work we do' (Tess, 031). Reliable data, purified through interpretation and analysis, informed '... a lot of change, for extra resources ... it does paint a big picture of the organisation' (Jo, 033). Jo explained further:

... the information that we provide ... will form the basis of a lot of decision-making processes within the organisation ... annual reporting, determining we need more [CWAU] ... in arguments ... with the Department [of Health] (Jo, 033).

These HIMs saw their work and translation capabilities as valued by the Executive and well-regarded throughout The Royal: '[w]e are valued. They can see ... how good we are ... we are versatile' (Kat, 035). The Executive Directors were '... one of the biggest requesters of information' (Jo, 033). The Executive Director to whom Jo, the Director-HIS, reported, took '... an avid interest in our area and he makes sure we get involved in a lot of things' (Kat, 035). The Royal's HIMs' roles

were increasing: ‘... the role of HIMs it’s just expanding. We are just getting bigger and bigger and bigger’ (Jo, 033). In many ways, they were visible:

In our own organisation ... HIM as a profession is quite well known and we are ... being pulled here, there and everywhere to assist with all these other different projects in different areas (Jo, 033).

They all know where HIS is ... you get to some hospitals and ... they don’t really know what we [HIMs] do, they don’t know what an HIS is ... but here ... they do know what HIMs are ... We’ve got HIMs [in] a lot of areas ... Quality, IT, everywhere (Kat, 035).

Junior HIM, Jess (036), explained the value to The Royal of the HIMs’ work. This hinted at an omnicompetence: ‘We are always going to be needed. We are the middle point, from IT to Executive, to the clerical staff members, to external agencies, because we know a bit of everything’ (Jess, 036). Reliable data, purified through the HIMs’ interpretations and analyses, informed ‘... a lot of change, for extra resources ... it does paint a big picture of the organisation’ (Jo, 033).

Mystery work

Notwithstanding this expansion, Lou identified a conundrum: ‘I see a lot of respect for HIMs’ (Lou, 068). She then noted an element of invisibility, consistent with behind-the-scenes work: ‘... a little bit of a mystery as to who we are and what we do. They really do take a lot of interest in what you have to say’ (Lou, 068). The HIMs did ‘... a lot of things ... that impact on the organisation in one way or another [and] are not recognised’ (Jen, 040). They were marginal in terms of clinical status, but central to the business. Their work had ‘... enormous impact in terms of support. The hospital won’t get their funding. The [SIMD data] doesn’t get submitted. The errors don’t get corrected. The data quality is not there’ (Jen, 040). Sal (034) observed that the health information was ‘very powerful’ and ‘... for such a small profession we actually have a massive responsibility ... we’re very, very important’. Their constant ordering and purifying of formalised data, therefore, was all-important.

Chapter summary

The Royal’s HIMs saw themselves as a ‘resource’ to the network in providing reliable health data, information and systems. They occupied a gatekeeper role in producing translations and critical boundary objects to support patient care, underpin The Royal’s clinical, research and financial-

business operations, and contribute to state- and national-level healthcare planning, epidemiology and research.

Prioritising standardisation and bureaucratic process, these HIMs undertook boundary spanning. They constantly bridged gaps across the organisation, and between The Royal and external parties. Their stated allegiances ultimately were to the patients, the Executive, and to clinicians as users of the health information and its systems. To these ends, they constantly problem-solved, unravelled problematic system and information flows, and interpreted and conveyed information between The Royal's stakeholders. In populating a critical interface between indeterminacy and paucity or absence of information, and reliability, knowledge and truth the HIMs ultimately enabled both managerial and clinical boundary objects and outcomes.

Source of truth

The establishment of one source of "truth" was a core objective of The Royal's HIMs. This was critically important in guiding their intensive translation work. To this end, they constantly undertook articulation work to engage allies across multiple boundaries; they negotiated, and persistently and extensively informed, abstracted, classified, standardised, and 'qualculated'. In their efforts to sanitise the data into coherent truth, they employed bureaucratic processual means to mitigate against the effects of human error in data entry and communications. Cognisant of the significance and reach of these data within and beyond The Royal's boundaries, they strove constantly, translating and classifying the problematic into workable, portable facts.

They saw the source of (the constructed) truth as a vital underpinning to the production of reliable, accurate data for corporate-level planning and management, and ensuring the network's compliance in statutory reporting to governments. Equally, it was seen as critical in supporting clinicians' work, and in enhancing patient safety and outcomes of care and treatment. Its value for healthcare service planning in the state arena was also seen as important, but acknowledged as being underestimated.

Owning the data

In rendering the data portable and workable, these HIMs were constantly classifying and making sense of the patient and his or her treatments and outcomes; they opined that their own expert classificatory knowledge was essential for correct data interpretation and informed analysis and reporting. They managed the data from the stage of form and screen design that facilitated their collection at point-of-care, through to post-discharge abstraction, classification, analysis, and reporting to diverse internal and external stakeholders. They performed extensive calculative translation work using numbers, lists, databases and software-embedded algorithms. These HIMs thus confidently owned The Royal's core health data: they had in-depth understanding of the data content, flaws, flows, applications and value to users. Ownership further empowered them to address problems in purifying the data, and enabled them to report informed interpretations and explanations to the Executive and other users.

Accountability

The Royal's HIMs took seriously their accountability for good quality data, reliable processes and systems, and - consonant with the risk society introduced in Chapter 2 - risk mitigation. This involved managing and reporting on a raft of internal audits and quality-related measures, and providing systemic mechanisms to ensure transparency of data in the eventuality of externally-conducted audits.

Positioning and (in)visibility

The Royal's HIMs saw themselves as positioned centrally between the Executive, IT, clinicians and external stakeholders. Their translation work and its outputs were, they observed, central to the network's operations, and expanding. The network's funding was dependent upon their work. Similarly, they reported that their outputs informed important strategic and financial decisions by The Royal's Executive. Some of the HIMs intimated that their contributions to the network's business and other operations placed them in a powerful position and that they were highly regarded by the network's Executive and Board of Directors. The HIMs confronted a plethora of challenges associated with data integrity, reporting timelines, pressure from the Executive to maximise revenues, technological limitations, system-generated clinical risk, classificatory decisions, and clinical staff who sometimes had to be cajoled into using improved systems and

documenting the care they provided. They therefore forged alliances. They standardised and formalised systems, processes, and data and created efficiencies in their quest to purify data.

Technological challenges

The classificatory technologies, standards, and computer systems were integral to the HIMs' translating and purifying. The ICTs promised and, ideally, facilitated what Agar (2006) describes as new ways of 'seeing' (p.871) the data and supporting the HIMs' 'infrastructuring' work. These promised attributes were problematic because of the gap between the expectations of the HIMs, as experts using the information technology as designed, and those ICT components as designed by the DoH's IT Unit. This situation effectively hindered the efforts of some of The Royal's HIMs in undertaking their core articulation work. In light of some ICT infrastructural limitations retarding performance and progress of their translation work, and in order to accommodate the limitations of the technology, The Royal's HIMs undertook constant problem-solving and work-arounds. Similarly, the translation of coded data from mess into the elegance of a usable report for researchers was sometimes frustrated by system redundancy created by changing technologies over time. There was a strongly-held view that classification knowledge, skills and interpretations were central to HIMs' professional practice. Indeed, classification was considered a critical component of the HIMs' knowledgebase.

Conclusion

This chapter described the findings derived from the interviews of the HIMs in The Royal Healthcare Network within the context of Star and Griesemer's (1989) institutional ecology model. These HIMs persistently and extensively classified, standardised and constructed 'coherent sets of translation' (p.390) within the contentious social worlds of The Royal's 'mixed economies of information' (p.413). They purified raw, unusable data into coherent, formalised truths that represented The Royal's patients, functions, costs, and operational outputs. This ordering work was undertaken in a landscape that reflected constant changes to: technologies; categories of disease; classification standards; and government reporting requirements. The implications of this work will be discussed in Chapter 8.

Chapter 7

Case studies in health information management

Introduction

This chapter presents two further case studies, each selected to reflect a component of Health Information Managers' work. The first explores the classificatory infrastructuring by a state-wide committee operating under the auspices of a state DoH. I call this the pseudonymous State-wide ICD Coding Committee (SICC). The committee's interpretations of the ICD-10-AM classification guide HIM-Coders' decision-making and practice. This classification-making is arguably a microcosm of HIMs' hospital-based classificatory work throughout Australia. The points of difference are that the SICC's decisions re-build and stabilise the classification, formalise code usage, and inform and influence state- and national-level policy, whereas the decisions of HIM-Coders in hospitals - as mentioned in Chapter 6 – pertain to locally-situated classificatory practices.

The second case study spotlights the implementation of a Patient Administration System (PAS) by a team of three HIMs operating across distance in rural Australia. This case was chosen for study because the technological, systemic and managerial aspects were likely to reflect PAS implementation commonly undertaken by HIMs. The distance-based nature of the implementation was likely to reflect HIMs' work in rural Australia.

As the chapter progresses it will become apparent that HIMs convert disorder into order, and undertake extensive infrastructural work.

Infrastructuring the ICD: a case study in health classification

The State-wide ICD Coding Committee

The work of making, maintaining and analysing classification systems is richly textured. It is one of the central kinds of work of modernity, including science and medicine. It is ... central to social life
(Bowker and Star 1999, p.13).

The SICC is the expert policy and practice advisory body on health classification in one of Australia's most populous states. The committee scrutinises and rules upon convoluted and technically challenging classificatory problems and associated government policy issues. The state government, and all hospitals, have a vested interest in the ICD-10-AM classification because it underpins that state's morbidity data collection, held in that state's equivalent of the State-wide Inpatient

Morbidity Database described in Chapter 6. Furthermore, it scaffolds the state's casemix-based (public sector) hospital funding system and the private hospitals' casemix model.

The committee

The Chair of the SICC was an HIM experienced in health classification and clinical coding auditing. The HIM-Coder members had expert classificatory knowledge and skills in the ICD-10-AM and AR-DRG classifications and practised in general and specialist hospitals.

Theoretical underpinnings

In explicating the work of classification making, knowledge production, and interpretation through the SICC's decision-making, I draw upon the seminal analysis by Bowker and Star (1999) of the ICD and classification work. Moving beyond Bowker and Star, I also observe local level classificatory decision-making that influences revenues and the official morbidity data. I recall Durkheim's (1995), Durkheim and Mauss' (1963), and Douglas' (1966) classificatory conversions of disorder to order and observe these at intense, and intimate, local level.

The dichotomous nature of the ICD-10-AM classification, central to Australia's health information, population health profile, and healthcare facility financing systems masks what Bowker and Star (1999) call a complexity of 'financial, skill, and moral dimensions' (p.5). These, and political dimensions, were seen in the SICC's deliberations.

The silence of classifying

We saw in Chapters 5 and 6 that HIM-Coders undertake expert classificatory work in Australia's hospitals. They re-construct each patient into formalised codes. The enabling technical processes include formal abstraction of the patient's medical record and the assignation of specialised codes to represent the diagnoses, surgical and related interventions, causes of injury, and other representations of (ill-) health status. They further translate these codes into DRGs, and then ascertain revenues for each case.

The approach

As described in Chapter 4, a case study approach using ethnography was chosen to explore the SICC's workings and decision-making. This approach, according to Star and Bowker (2006), is useful in interpreting infrastructure in science and technology studies and for foregrounding discussions about materials such as standards and tools for knowledge production.

The consent and research processes were explained in Chapter 4. Additionally, immediately before each meeting the Chair sought confirmation that all members were comfortable with my presence and on the first day invited me to comment on the research project.

Making and administering the classification

The ICD classification is in many ways an ideal mirror of how people designing global information schemes struggle with uncertainty, ambiguity, standardization, and the practicalities of data quality

(Bowker and Star 1999, p.26).

The SICC at work

The committee addressed classification and casemix-related policy issues and coding 'queries', the latter with attached explanatory clinical and classification briefings or discharge summaries submitted by 'inquirers' who were hospital-based HIM-Clinical Coders. All patients', hospitals' and staff members' identification was removed from all documents at the source hospital. The committee members were blind to the hospitals' and inquirers' identities. The members' duties included substantial pre-reading and pre-classification of cases on the agenda, and active contribution to the decision process.

The members operated within an administrative paradox: they belonged to a committee of the state government's DoH, yet many were employees of public hospitals funded by the government, via the DoH. Furthermore, their hospitals' casemix-based funding was contingent upon rules and decisions made or interpreted by the committee. Some members were from private hospitals licenced by the DoH and subject to its operating guidelines; whilst the funding model differed it, too, was underpinned by the ICD-10-AM and AR-DRG classifications.

The agenda

The SICC's workload was exemplified in the agenda for one of the observed meetings that contained 32 current queries under review. The Committee had referred several of these to the National Classification Institute (NCI) and was awaiting clarificatory responses. Additionally, 17 new queries were documented in 42 pages of coding problems. The Chair commented that this was 'typical' (S.101) of the Committee's workload.

Each meeting day comprised three or more intense sessions. The SICC's processes were rigorous: most first-time queries on the agenda were referred to a second meeting for further deliberation or, where additional clinical information was needed to inform a decision, to allow time to accumulate more pathological and treatment details. The processes afforded the committee flexibility to re-schedule some queries for a third occasion of review. When unable to form a response, the SICC referred the query to the NCI.

Complex issues, difficult decisions

The Chair led an orderly progression through the agenda. The decision-making was intense and highly contested. The first session usually began with state-level policy-related matters concerning classification and casemix-based funding. The coding queries were then considered. A bureaucratic, legalistic approach was evident in the constant toggling between standards, coding conventions, the committee's decisional precedents, the state's additions to the standards, previous rulings of the NCI, medical documentation issues, and accompanying clinical statements and facts relevant to the condition or procedure under-code. The Chair allowed lengthy discussion and negotiation before gaining agreement, deferring the item to the next meeting for re-consideration or, where there was a gap or failure in the classification, referring the query to the NCI.

The committee's decisions and underpinning logics were minuted in detail. This formed both the official record and part of the response to the inquirer. The response, constituting the SICC's interpretation and justification, was sent to each inquirer at the conclusion of a query process that could take several months. This timeframe was subject to: the complexity of the coding problem; the technical classificatory capacity of ICD-10-AM and the ACS to facilitate appropriate code

assignment; whether the problem was resolvable or had to be referred to the NCI; and the Committee's workload. The Chair observed: 'Coders are often the last people to look at the record [before completion] and make a decision. Coders need to understand what the record is saying, and the policy' (S.101). The committee addressed a wide range of policy matters; the following is one example.

Admission policy for establishment of lactation

This item concerned amendment to the government's policy on re-admission of new mothers to hospital, to establish lactation. One member identified inconsistency in the DoH's directives to hospitals for the recording, coding, and reporting of this clinical activity: 'DoH needs to advise ... on lactation. We don't know what to do with [the data], how to report that activity. There is an assumption [by DoH] that these patients are not admitted' (S.106).

Commentary

The discussion reflected two characteristics of classificatory work in a casemix-based funding environment. First, the classification is inherently social in codifying the deceased, the sick, and the well. New mothers wishing to establish lactation are not ill, but require the healthcare service of a midwife. Second, there was politicisation of clinical coding and its associated DRG grouping and casemix-financial data analysis: were these patients not 'admitted' (and, instead, treated on an outpatient basis), hospitals would receive less reimbursement for this service; hence, the concerns about policy inconsistencies. Furthermore, in a casemix-based funding environment, classification practice can be influenced and mediated by bureaucratic, financially-driven decisions. This agenda item thus exemplified the intersecting financial, social, and political impacts of clinical coding and related policy-making.

Coding queries

The following examples demonstrate classificatory queries ruled upon by the committee. The (underlined) codes and discussions are included to convey the depth and complexity of the queries and the extent of intensive negotiation and attention to bureaucratic and classificatory detail that attached to the committee's complex decisions.

Coding Query: example 1

The SICC had previously deliberated on this query, the details of which are shown in Box 18. The committee referred it to the NCI because the ICD-10-AM and its conventions and standards did not provide an answer to the coding problem, received clarification from the NCI, and responded to the inquirer who requested further clarification.

Box 18 Query: MRI brain, Cerebral Cell Study and Stereotactic Localisation

The inquirer referred to the NCI's initial response that code 40803-00[1] *Intracranial Stereotactic Localisation* was appropriate for the case. The classification incorporated an *includes* note for Magnetic Resonance Imaging (MRI) that HIM-Coders needed to apply, as well as (the relevant Australian Coding Standard) ACS-0639 *Stereotactic Radiosurgery, Radiotherapy and Localisation* which provided a further directive on the coding of Intracranial Stereotactic Localisation.

The clinical facts indicated that this *MRI Brain/Cerebral Cell Study* was undertaken the day prior to surgery. The inquirer posited that it was erroneous to assign code 40803-00 [1] for the procedure and then to replicate this by re-assigning it for the localisation performed the following day during neurosurgery. The inquirer cited a neurosurgeon's advice that the MRI was not the localising device: a stealth MRI or Computerised Axial Tomography (CT) was undertaken the day before the neurosurgery. Fiducial markers, i.e. dots placed on the patient's head to define its shape, were positioned in preparation for the operation. The Stereotactic Localisation was carried out during the neurosurgery.

The inquirer claimed that code 90901-00 [2015] *MRI Brain* should be assigned for *MRI Brain/Cerebral Cell Study* when the MRI was performed before the surgery. He or she further contended that if the imaging procedure was performed during neurosurgery it should not be coded because it was incorporated in the Stereotactic Localisation code.

The SICC had discussed the query in four meetings. Its status as a challenging query about highly advanced procedures, warranting in-depth consideration by some of the nation's most knowledgeable HIM-Coders, did not set it apart as it typified the complexity of many queries witnessed during this research. Re-submitted, it was now treated as a new query, re-addressed, and re-referred to the NCI regarding the appropriateness of assigning code 09001-00 [2015] *MRI Brain for MRI Brain/Cerebral Cell Study* when the imaging was performed prior to surgery.

The query was tracked systematically and notations made at each of 10 successive meetings of the SICC that it was unresolved, pending feedback. When the NCI response arrived, it concurred with the inquirer's suggested codes.

Further deliberation

In sessions observed for this research, there were further discussions about the two different approaches to coding MRI associated with neurosurgery. On one occasion, a committee member observed that had the inquirer followed the NCI's initial advice, that hospital would have fraudulently 'claimed twice for payment' (S.105) for an MRI scan as the DRG would have changed. The issue was resolved pursuant to agreement that an MRI done prior to surgery should be coded as *MRI* and, where localised in surgery, coded as *Included in Stereotactic Localisation*.

Commentary

The coding rules dictated that an MRI undertaken during surgery must be incorporated within the Stereotactic Localisation code. The SICC's solution to the problem thus involved a part-political decision (redirection to the NCI) and a part-technical decision (determination of preferred ICD-10-AM codes).

Reverse salients

In ruling on complex, technical coding queries the committee also dealt with what Hughes (1987) calls 'reverse salients' (p.73) which are sticking points or parts of a technology that have 'fallen behind' (p.73). These are inevitable in contemporary health classification as medical technologies and practices are adopted at a faster rate than classification systems can be developed. Neurosurgery is a highly specialised discipline: to ascertain the correct ICD-10-AM code assignment, the HIM-Coders needed to understand how and why the procedure was conducted, and to speak the languages of neurosurgery and diagnostic radiology.

The query pathway demonstrated the SICC's systematic approach. Upon the second submission, the inquirer was persistent and attentive to clinical and classificatory detail, eventually eliciting a revised directive. The SICC further discussed the clinical technicalities before deferring the decision to the next meeting for finalisation, acceptance, and forwarding to the inquirer.

Coding query: example 2

An inquirer requested advice on correct code assignment for patients admitted to hospital for allergy challenges. Two scenarios were provided and these are described in Box 19.

Box 19 Query: allergy challenges

Scenario 1. A patient admitted with a suspected peanut allergy was given a smear of peanut butter on the inside of the mouth. Upon clinical observation, she was found to demonstrate no signs of reaction. The query was whether code Z03.6 should be assigned as the Principal Diagnosis.

Scenario 2. A patient admitted with a suspected peanut allergy was given the same allergy test. A positive reaction (Urticaria [Hives]) was observed. Zyrtec (medication) was prescribed and administered. Following further observation, the patient was discharged home. The query concerned whether the code sequence should be either: P) Z03.6, C) L50.0, C) Y57.9, C) Y92.22; or P) L50.0, P) Y57.9, P) Y92.22.

In the second scenario, the first code sequence was questioned, specifically whether Z03.6 was the appropriate code and Principal Diagnosis (PDx) or, as the patient had experienced a positive reaction indicating a condition no longer 'suspected' but diagnosed, whether a 'T' code should be assigned as PDx. Initial deliberations concentrated on whether this would incorrectly identify these types of patients as admitted with a current adverse effect or an anaphylactic reaction when, in fact, they had been admitted as 'well' and had subsequently been diagnosed following reaction to the challenge test.

Commentary

The SICC agreed that in accordance with the relevant ACS-0001 paragraph titled 'Codes from the Z03.0-Z03.9 series, medical observation and evaluation for suspected diseases and conditions', the inquirer's suggested code for the first scenario was the correct PDx code. The query was reviewed at the next meeting and the decision reiterated. There was agreement for resolution, but the decision remained unconfirmed.

The issues in Scenario 2 were revisited in two subsequent meetings. Some members advised that L50.0 (*Allergic Urticaria*) was the correct code to assign, in accordance with ACS-0001. It was agreed that the residual category 'T' code (T78, *Adverse effects, not elsewhere classified*) should not be assigned as PDx because the specific allergic reaction had been diagnosed and documented by

medical staff. The committee noted that the classificatory guidance note for T78 permitted this as an additional code.

There followed an animated technical coding discussion including exchanges about the meaning of ‘test’ which, members concluded, differed from a ‘drug challenge’: ‘[w]hy not Z01.5? [*Admitted for Allergy challenge*]’ (S.114) and ‘[b]ecause of the difference between oral challenges and the skin testing. This is an oral challenge’ (S.102), and ‘[i]f you look up Test - Allergies in the Index [to the classification] - you get Z01.5’ (S.106). This differentiation affected the code assignment. One member cited an old NCI response that explained why Z01.5 could not be used. Another argued that ‘[t]he Principal Diagnosis Standard is quite clear’ (S.117). The question was asked: ‘[i]f it is not Z01.5, *Admitted for Allergy Challenge*, why not use Z03.6 as the Principal Diagnosis code?’ (S.109). The Chair articulated key questions to elicit logical answers on correct code assignment:

- ‘Was the patient admitted with the suspected condition, or was the patient admitted for treatment of *Urticaria*?’
- Alternatively, was the patient admitted for peanut allergy, in which case should the External Cause code be used?’ (S.101).

More perspectives were offered on application of the standards:

[u]sually a patient would present with symptoms and Australian Coding Standard 0001 would apply. If the patient tests positive, the ‘Z’ code should be used. If the patient tests negative, the symptoms should be coded (S.104).

Another member drew the committee’s attention to ACS-0026: ‘Admitted for clinical trial, drug chemotherapy, or therapeutic treatment.’ Others responded that the scenario was not about drugs but, rather, a food allergy. There were references to allergies to other foods, and even to dust mites. A member drew upon the precedent of a previous query on coding of a shellfish allergy.

It was postulated that ACS-0001 applied because the test outcome should be coded as the PDx. If the outcome were otherwise, it was argued, code Z03 alone should be assigned. A comparison was drawn with *Swallowing of a foreign body* such as tablets. It was suggested that code Z06 would be assigned if symptoms were coded. A member who had consulted an Allergy Specialist about the

clinical details of Scenario 2 concerning the External Cause, contended that this was the correct code.

A discussion ensued about codes assigned when a patient was admitted for a suspected allergic condition. The committee concluded that three coding scenarios were possible. An Exclusion Note in the classification was identified. Finally, the most revealing comment of this extended decision-process was heard: '[n]othing is black and white [in coding]' (S.105).

At one point, the Chair reminded the committee that the focus should be on 'the categorical. Having to decide on the category is the issue' (S.101). It was agreed that code Z03.6 should be assigned where a patient experienced a negative result in an allergy challenge, whereupon a code should be allocated for the manifestation of the allergy. The Chair carefully enunciated the wording of the committee's response: '[F]or the scenario you have described, when the patient is admitted for suspected allergic reaction, these are the answers ...' (S.101). The response to Scenario 2 included: 'If you assign Z03, you can assign Z03.6 as stand-alone. You can't have Z plus L50.0 together' (S.101).

The primacy of the classification

In the meetings there was occasional re-direction by the Chair to "the classification". The independence and supremacy of the ICD-10-AM were challenged when difficult coding queries were analysed. The members occasionally conceded that omissions or flaws in the classification needed rectification. These typically concerned provision for new clinical diagnoses, operative procedures, and applications of new technologies in patient care.

Many members privileged the concept of classification over the financial and organisational demands of DRGs and ABF/casemix-based funding. This revealed what Bowker and Star (1999) call the 'balancing act of classifying' (p.325). It also demonstrated the members' respect for the classification's integrity and for orderly, classificatory practice. At times, members re-focused their comments on the centrality of the classification process; they emphasised 'the rule of rules' (S.101;

S.104), reflecting their understandings of the importance of their interpretation and applications of the rules and standards.

Adherence to the rules lent consistency and, therefore, reliability to the coded data for use in representing population (ill)-health, clinical and epidemiological research, and health services planning. It also rendered consistency in classificatory practice; for example, at one point a member asked the question, '[w]hat do we tell our [HIM-]Coders to do here?' (S.113). A more pragmatic approach, also admitting the balancing act of classifying, acknowledged (but did not privilege) the centrality of classification in hospitals' revenue justification and financial well-being.

Case summary

I have described my observation, with what Berg and Timmermans (2000) term 'an ethnographic eye (the real-time performance of the order)' (p.37), of the SICC's social construction of the universality of classification. This work constituted a fluid and fragile process.

Visibilising the HIM-Coders

The SICC's decision-making rendered visible the voice of the HIM-Coders and maximised 'political flexibility' (Bowker and Star 1999, p.325) in the DoH's policies and coded datasets, the classification, and the casemix-based funding system. The committee's decision-making left a trail of traces: these comprised advisories, state-based amendments to ICD-10-AM standards, and recommendations on government policy, in the mould of Bowker and Star's (1999) 'permits, forms, numerals, and the sometimes visible work of people who adjust them to make organizations run smoothly' (p.2). The decisions were transparent and available to the state's hospitals and HIM-Coders via database, website and electronic bulletins.

'Infrastructuring' the SICC

A complementary interpretation is that the classification and its rules, conventions, standards and precedents, together with the committee members' and HIM-Coders' socially-oriented decisions, framed the classification work. The dual identity of the ICD-10-AM as an information infrastructure, while concurrently constituting and informing the SICC's infrastructural work, reflected

characteristics of classifications identified by Bowker and Star (1999). The ICD-10-AM was contextually embedded in producing and creating comparability of data and information within hospitals, government bodies and multiple other user-organisations, and the SICC was instrumental in driving and influencing this property of the classification.

There is no perfect classification because ‘comparability and control work against standardization’ (Bowker and Star 1999, p.232). In the realm of the SICC, controversy and negotiation were rife at the liminal sites on the disputed borders of codes, standards, and categories. They were also endemic in the dilemmas of defining and reifying documented diagnoses and procedures, as exemplified in the above queries. The nature and influence of the SICC’s work in (re-)building the classification, and managing and guiding its interpretation and use, rendered it a part of, or extension to, the ICD-10-AM infrastructure.

The ICD-10-AM had a dual identity as technology and the political output of knowledge production. The SICC mirrored these characteristics in enacting its formal decision process. Furthermore, the SICC was owned by the DoH, and kept the ICD-10-AM dynamic. It made decisions that reflected the DoH’s interests and, ultimately, the financial interests of the government of the day. Additionally, and sometimes in contrast, it reflected the SICC members’ professional classificatory interests.

The politics of coding

Classification schemes, according to Star (1998), are ‘neither innocent nor arbitrary’ (p.220). As a boundary object, the SICC dealt with the extremes of first, abstraction, in determining and applying coding standards and, second, the concreteness inherent in creating and following precedent and using a rational system for decision-making and promulgating. The SICC made ethically-loaded and politically mediated decisions, such as in the *MRI Brain/Cerebral Cell Study* case: subsumed in the technical language of clinical coding, the repeat query reflected the iterativeness of classification development.

The only way to access the past, Bowker and Star (1999) inform us, is through ‘classification systems of one sort or another’ (p.41). The SICC and the ICD-10-AM were stable, durable

institutions that enabled this access. The SICC informed, challenged and mediated the classification temporally, through successive versions. The membership exerted a powerful modifying and stabilising force on the ICD-10-AM, the ACS, and coding practices. The SICC both reinforced and challenged the NCI and was an informed, authoritative body in the landscape of Australian health classification within the healthcare system, mediating and bringing classificatory order to the messes of patients' bodies and diseases, the hospitals' medical records, and hospitals' funding arrangements.

The SICC members' categorical decision-making was observed to balance what Bowker and Star (1999) call their 'multiple memberships and the multiple naturalisations of objects' (pp.286-7). Linked to these concepts is the meta-principle of this dissertation, outlined in Chapter 1, that this study's participants undertook conversion work, translating disorder into order. In the languages of Durkheim (1995), Durkheim and Mauss (1963) and Douglas (1966), the SICC converted the profane into the sacred.

Implementing in the wild: a case study in health informatics

Technological systems contain messy, complex, problem-solving components. They are both socially constructed and society shaping

(Hughes 1987, p.51).

We now consider the final case study. This involved the implementation of a Patient Administration System (PAS) by a team of three HIMs. I draw primarily upon the following three theoretical frames through which to observe their work.

Theory of distributed cognition

The first of these frames is Hutchins' (2001) theory of distributed cognition, introduced in Chapter 2. Based on his observations of human activity 'in the wild' (p.2068), it is reflective of these HIMs' across-distance work. Hutchins' theory links cognitive processes that are tri-dimensionally distributed across social group memberships, between individuals and their environments, and temporally (Hutchins 1995, 2001). Knowledge, for Hutchins (2012), is embedded in practice.

Imagining work

Secondly, the implementing HIMs' imagining (mental) work is considered in the context of Mackenzie's (2003) description of telecommunications workers' distance-based development and operation of a large-scale system: '[t]he integrity of a system has to be imagined, because it cannot readily be seen or articulated' (p.369). Mackenzie identifies a meeting point between the imagining, and the doing or infrastructuring. It will become evident that these HIMs operated at this intersection and crossed the 'digital divide' (p.369). Whereas Mackenzie refers to the analogue-digital divide in telecommunications, the HIMs' new PAS enhanced or updated manual and electronic systems with new electronic versions.

Disorder into order

Stages of implementation

The HIMs' activities, which involved constant ordering, aligned with the stages in other health system implementations such as described by Hanken and Murphy (2007, 2012), *albeit* sometimes with different orders or terminologies. As articulated by the implementing HIMs, these were: data cleansing; data migration and testing; system integration testing; user acceptance testing; staff

training; change management and acceptance; operational readiness; code freeze; dress rehearsal; and Go-Live. It emerged in the current study that these stages were not discrete, sequential silos of activity. Several were overlapping and recursive, reflecting the disorderly world of technology implementation wherein the HIMs laboured to replace old systems with new versions mandated by the state. This attempt to re-impose order was reminiscent of the transformation of the profane to the sacred, as described in Chapters 2 and 3 and earlier in this chapter (Douglas 1966; Durkheim 1995; Durkheim and Mauss 1963). It also reflected Star's (1995b) notion of making sense of 'the disorder of workplaces' (p.97).

The research process

The HIMs' work was explored ethnographically via my unobtrusive observation of their activities, including in project committees and dealings with stakeholders. This was supplemented with between one and four face-to-face, in-depth interviews with each HIM. I also conducted face-to-face, in-depth interviews with the Chair of the project Steering Committee and the Alliance's Executive Officer (EO). In order to bring further depth to my account of this implementation, I elicited the views and experiences of an agency Project Lead (HIM) via face-to-face, in-depth interview 15 months post-implementation. By this time post-implementation insights, following rectification of bugs and consolidation of work process changes, were likely to be valuable.

My focus was on the HIMs' implementation of the PAS. It did not reside in the system design, nor the information technology or its evaluation, as these constituted different phenomena. I describe the implementation via its stages and snapshots of activity at different points along the way to Go-Live.

Technology

The implementation rested on the physical foundation of hardware and software. Beyond these were the activities and processes that engaged and produced the technology and were reflected in the work of the various actors and stakeholders including HIMs, committees, Alliance support staff, vendors, the state DoH's IT Services Unit (ITSU), and Agency Leads. Superimposed on these components were the 'know-how' and capabilities of those working with the technology who, for

the purposes of this analysis, were the implementing HIMs. This structuration is reflective of Bijker, Hughes and Pinch's (1987) reading of the tripartite layering of technology, introduced in Chapters 1 and 2, and reveals the embeddedness of the HIM team in the technological implementation.

The research setting

The implementation was undertaken in a regional AHN comprising 10 collectives of healthcare facilities and services geographically located throughout the Plains Region⁴⁶ covering 48,000 square kilometres in rural Australia. Each healthcare collective, hereinafter called an 'agency', had at its core a hospital and up to five additional facilities providing acute care, residential aged care, rehabilitation, bush nursing, and community health services to the populations of their rural and semi-rural catchment areas.

The Plains Health IT Alliance (hereinafter called the 'Alliance') was generically a collective of organisations engaged in what Kanfer et al (2000) describe as 'collaborative relationships usually involving multiple channels of communication and knowledge diffusion across disciplinary or organizational boundaries' (p.318). The Alliance provided ICTs for the 10 healthcare agencies, and liaised with the ITSU on its program for introducing the new PAS into the state's public healthcare agencies.

The implementation team

Three HIMs, Ali (023), Beth (022) and Cass (021), constituted the core of the Alliance's PAS implementation team. They were all 'highly organised ... The HIM skills that we have all acquired ... we have all run [hospital] Health Information Services ... [Cass and Beth] have been involved in previous implementations' (Ali, 023). Their support team, whose work was not the focus of this study, was a small technical and administrative group. The HIM team operated from the Alliance's headquarters in a regional city physically distant from the 10 implementation sites. Oriented to the agencies' capacity-building for future electronic health record systems, Ali wanted to implement:

⁴⁶ Pseudonym used to protect the identity of the region's health services and their employees.

... a better product than what they used to have, that has added value to their service and ... works really well and ... is robust ... and they have had a change management exercise happen in their agency ... and it is a building block for other things (Ali, 023).

The team's expertise

The Alliance's EO (020) summarised the expertise of his HIM implementation team:

They've got a health information management background. They've been very good at analysis ... very good at understanding processes ... They tend to be ... very detail-oriented people but they can step up to be project people ... But it's always about quality, it's about the deliverables. This has to work ... because it's about patients. It's about consumers. And it's about ... equipping clinicians with the appropriate tools and that transcends all of ICT in the information management field ... it just shows you actually can have people that have a particular discipline and you can apply that to multiple areas. And Health Information Managers are very much like that (020).

The new system

The PAS is the backbone of healthcare institutions' information systems. Developed by a commercial health software vendor company and mandated by the DoH for state-wide use, this PAS's patient management sub-systems included: Admission, Transfer and Discharge; Clinical Referrals; Disease and Operation Indices; Cancer Registration; Waiting List; Theatre Bookings and Billings; Outpatient Appointment Scheduling; and Discharge Summary.

Decision-making structures

The Steering Committee

The implementation Steering Committee represented the purchasers who were the 10 agencies' Boards of Management and CEOs. The Chair was the Deputy CEO of one agency and, coincidentally, an experienced HIM who brought understandings of both the purchaser agencies and health information system requirements. She saw her role as ensuring a smooth implementation so that all agencies 'have at the end of the day a system that, when we Go-Live, is workable' (024). The membership also included the Alliance's EO, Ali, and vendor and ITSU representatives.

There were subtle, political complexities. The 10 agencies' CEOs were signatories to the enabling Joint Venture Agreement. The Chair explained that the Steering Committee, as the agencies' representative in guiding the process, was beyond the auspices of the Agreement: '[w]e ... don't have a huge capacity to make changes. We ... facilitate the introduction of it [PAS]' (024).

Notwithstanding this, the Steering Committee's oversight role was important because the purchasers otherwise had 'little information about what's going on [and] ... they're the ones who are providing the money' (024). The Chair observed that the new system was costly for these rural health services, involving 'for an organisation such as ours, a substantial financial contribution' (024). Some agencies were implementing the new PAS because the state's DoH was about to obsolesce their legacy systems:

It's costing a bomb of money to put in a system in some of these tiny sites which are only going to use 10% of the functionality ... they have been told they have to put it in. They are trying to keep their health organisation viable so it doesn't close down. They don't want special bells and whistles (Ali, 023).

The Project Managers' Committee

This committee drove the project implementation. It comprised Ali (Chair), Beth, Cass, the Alliance's EO, and two technical and administrative support personnel.

The Team Leaders' Committee

The operational level Team Leaders' Committee comprised Beth (Chair), Ali, Cass, and the 10 Agency Leads. The latter were HIMs or, in very small agencies with no HIM, administration managers who were guided by the HIM implementation team.

Back to the beginning: technology versus patient privacy

At the beginning a major, controversial decision was made regarding the agencies' databases; because of its implications, this is included in the case study.

In efforts to rationalise and standardise systems, and minimise establishment costs, the ITSU had directed that instead of each agency having the usual, stand-alone patient database, a common regional database would be established. This would hold the PMI and significant volumes of patients' personal and clinical information. This database was built by the ITSU. The data on all patients held in the agencies' databases were checked and cleaned by the HIMs to fit the new system's parameters; their next step was to migrate these data to the single database. This plan went awry when the HIM implementation team challenged the ethics, legality, and business practice underpinning the proposed central database. Patients had not given consent for staff in

other agencies to access their health information, and the agencies had neither legal nor ethical authority to allow such access. Had the planned, single database proceeded, potentially there would have been widespread breaches of patients' privacy. As Beth (022) explained:

Privacy was a big issue for us as an Alliance in not going to a single database ... [it] took a lot of pushing ... to get that through because we didn't feel a single database met privacy legislation [requirements] (Beth, 022).

The Alliance convinced the state DoH: '[w]e ... had to convert a few people ... [DoH's] interpretation ... was of an Alliance of one, whereas ... we are 10 health services, 10 Boards' (Beth, 022). Absent previous and current patients' consent to share their health information, '[t]here was no way we could migrate 10 years of data because we haven't had consent to do that ... [and] there is a lot of information in the PMI ... sensitive information ... [Sharing this] across 10 or 20 sites' (Beth, 022) would be problematic.

The DoH's policy for allocating a region-wide, Enterprise UR Number was fraught with complexity. The HIMs noted the techno-bureaucracy's inflexibility in overlooking what they adjudged as risks to patients' privacy: 'X has got a record in ['A' hospital] and in ['B', another agency's hospital] but only certain people can know that' (Ali, 023). The Steering Committee was cognisant of the additional effort, time, and cost necessary to establish, test and implement 10 databases instead of one. According to Ali and Beth, once alerted to the potential problem the CEOs and their Boards of Management were concerned primarily to protect the confidentiality of their patients' information and to prevent associated legal and organisational reputational risks. The Steering Committee therefore approved 10 separate databases and the agencies provided additional funds. The policy change precipitated by the HIMs established a precedent for other regions, challenged the DoH's techno-bureaucratic *status quo*, and gave voice to the region's unseen and hitherto unheard past, current and future patients.

A moment in time ...

From treed grounds I entered a single-level building and thence a vast office space. I counted 12 people comprising the three HIMs, computer technicians, and administrative support staff members. The Alliance's EO was in the adjacent office. I now shadow the implementation as it

progressed through the aforementioned, typical health system implementation stages (Hanken and Murphy 2007, 2012).

Data Cleansing, and Data Migration (and testing)

Systems Integration Testing and User Acceptance Testing were critically important: the new system needed to be tested separately for each agency, and it had to work. During my previous visits to Alliance headquarters, the HIMs were undertaking essential activities; e.g. the aforementioned data cleansing, involving processes described by Amatayakul (2004) as being for 'detecting and restructuring of bad data to ensure quality and usefulness' (p.160), was pre-requisite to implementation. Anderson (1999) describes the data transfer as migration; once migrated to the new system, the data on all patients previously treated by each of the 10 agencies were tested for availability and integrity.

The HIMs were familiar with the taken-for-granted minutiae of data items. They were reasonably confident of the data quality, post-cleansing. Ali's networking within what Bowker and Star (1999) call the 'community of practice' (p.294) of HIMs managing similar implementations revealed that two metropolitan AHNs had experienced post-implementation problems with old, dirty data. Examples included gaps, formatting errors, and additional fields in the new database: '[y]ou have got to find a way of moving the data across and populating those other 10 fields with the information that was never in the old system ... You can never do enough testing' (Ali, 023).

System Integration Testing

System integration testing, according to Hanken and Murphy (2007), involves several phases whereby 'the new system is tested with other information system components' (p.337). Here, it included 'making sure that [the product] connects to ... all other software' (Ali, 023) used by the agencies.

Ali chaired a technical meeting and co-ordinated the resolution of IT problems surrounding System Integration Testing. The HIM team had developed the reference tables, founded relationships with the agencies, determined and approved system modifications, established the User Acceptance

Testing plan and database, and commenced data migration. They were re-migrating and repeatedly re-testing the data:

Cycle 1-Cycle 2 means you run through migrating it several times to see if there are any errors ... you fix them, change the scripts and then re-do the data migration ... to make sure you have got less errors the next time (Ali, 023).

Beth gave clear information to the Team Leaders' (region-wide) videoconference: 'My advice is to concentrate on checking and testing and time lines' (Beth, 022). The HIMs advised the Agency Leads on technical and processual problems, and adhering to schedule. There was attention to detail; e.g. a computer technician was asked to refer errors in templates back to ITSU for rectification.

User Acceptance Testing

Testing is seen by Beizer (1995) as a fuzzy concept, while Rooksby, Rouncefield and Summerville (2009) describe it as 'a process in which we create mental models of the environment ... [involving] creating, selecting, exploring or revising models' (p.561). Cass explained:

At the back-end⁴⁷ we know everything that opens and shuts and that's where we will get into, in Acceptance Testing of the functionality, to make sure we have configured it right and it works ... every function in [the PAS]. I think there are over 5000 ... all have to be tested. We are doing this 10 times [i.e. for each agency] (Cass, 021).

In projecting resource requirements, the ITSU had miscalculated the extent of testing. This 'big oversight' (Ali, 023) created flow-on effects for the implementation team and agencies. In User Acceptance Testing, a test database incorporating the new system's features and functions, and loaded with false data on "dummy" patients, was established and tested by the implementation HIMs and provided to the agencies for practice runs. Each agency was undertaking time- and resource-intensive end-to-end testing, running hypothetical patients through the system, and identifying bugs and process problems:

We are doing catch-up ... asking the agencies to ... test to the best of their ability. We're giving them some tools ... testing a product as complex as this [PAS] means trying to break the system ... [enter] rubbish data and get it to break, then you're really testing it (Ali, 023).

⁴⁷ The back-end of a computer system is the colloquial term for the technical aspects, such as the database and server. These reside in the background, unseen by the user. In contrast, the front-end is the point of interface or interaction between the user and the computer or the application.

Agency No 5's HIM ('E') reported to the Team Leaders' (region-wide) videoconference that her agency had not completed enough User Scenarios for putting private or Department of Veterans' Affairs patients into the (test) system and through the theatre, discharge, coding, and billing processes.

Imagining

Like Mackenzie's (2003) workers, the HIMs' 'intense imaginings' (p.382) and insights enabled them, in the manner that Berg (2001) describes, to identify issues, anticipate obstacles, and undertake this complex system implementation across multiple boundaries. In User Acceptance Testing, Ali, Beth and Cass visualised the systems as they were out in the agencies, and as they would be with the new PAS. Their deep professional knowledge of healthcare agencies' requirements, practices and artefacts allowed them to anticipate potential problems in geographically and spatially distant environments. They envisaged systems, policies, procedures, work and documentation practices, patient and information flows, and agency-users' requirements; the latter were HIMs, clinicians, managements, finance and administrative staff, and adjunct services. The implementation HIMs mediated the operations and effects of the new PAS in each agency including its functionalities, how it should operate and interrelate, changes to processes, and what (and how) outputs should be constructed. This imagining was constantly re-communicated and re-consolidated in meetings, and via email and telephone.

One question for the team was whether a second cycle of User Acceptance Testing was required. The HIMs needed to identify residual problems and ascertain whether there was time for rectification. The systematic testing unearthed discrepancies and omissions, including the lack of a core reporting functionality. These issues came to the fore in a team leaders' videoconference, in which the HIM from Agency No. 3 ('C') reported the absence of essential categories from the suite of standard reports, including classification and funding-related details. This would affect production of important casemix-related reports and potentially create significant revenue implications for the agencies' Executives and Boards of Management.

Staff training

User Training at all sites was imperative as the Agency Leads had to adopt, and adapt to, system and organisation work-flow changes. The Agency Leads had to manage the new system and its interactive processes, and train clinical and administrative colleagues. The establishment of new workflow processes and procedures is seen by Coiera (2015) as standard implementation practice. The implementation team amended the product vendor's User Manual for the agencies, which tailored it to incorporate their idiosyncratic front-end user features and functionalities.

Change management and acceptance

The complex information systems demanded adaptive and flexible management by the implementation team, such as in addressing deficiencies in the new PAS's finance-related functionalities as observed in a Team Leaders' (region-wide) videoconference. The implementation steps were overlapping here, as User Acceptance Testing blurred with Change Acceptance. Agencies reported on their management of the billing system interface for the full sequence of the patient continuum, from pre-admission to the end of the post-discharge documentation flow. One agency reported a 'snag' with ED billing, contingent upon change acceptance by clinical staff: 'It depends on the quality of data put in by nursing staff' (HIM 'J', Agency No.10). The meeting revealed the agencies' dependence on the smooth operation of the new PAS for their billing and finance functions. The Chair (Beth, 022) advised that the Steering and Project Managers' Committees would consider resourcing for additional testing and staff training. The socio-technical interface was peeled open in this meeting. Each worker was part of his or her agency's system and the technology was interdependent with critical functions: patient registration, admission and discharge; and data input by administration and nursing staff members and, in theatre, by surgeons. There were also coded, casemix and demographic data input by HIMs, HIM-Coders, and Certificate Coders, and the use of certain data for financial purposes.

The technology's operation depended upon the administrative and clinical workers' learning and incorporating changed practices in work routines. At a Project Leaders' videoconference, one Agency Lead reported that the training had 'uncovered more uncertainties than envisaged, for example getting the Theatre process to work. We won't be able to pre-admit ... patients ... prior to the date [of surgery]' (HIM 'C', Agency No.3). Another Agency Lead was attuned to the social issues,

specifically pressures: 'Training is underway. Billing has been visited by all staff and is ok. Testing for all sites has been done by one person, who is now "over it"' (HIM 'D', Agency No.4).

Enabling change

During this stage of the implementation there was significant management of risk, including slippage, although some delay was 'probably acceptable in the IT world' (Ali, 023):

It's all to do with us trying to minimise risk. There's always a balance ... We originally were talking about a Go-Live in June ... moved to July ... August. That's what every other health service ... did, a couple of months (Ali, 023).

The HIMs addressed different change-reactions: 'In some of those health services ... [staff] say this is a great opportunity to automate our billing and get rid of the old manual system, or to change the way we do things' (Ali, 023). Elsewhere, there was resistance: '[Of] those 10 health agencies ... three or four ... are very resistant to some parts of the change' (Ali, 023). Beth constantly interfaced with and used her knowledge of 'the data, the people, the process, and the technology' (Beth, 022): maintaining relationships was critical, as was 'understanding the importance of the data and reporting, and the processes' (Beth, 022). She flexed between the agencies, the human and non-human elements of the implementation, and the dominant health information ecology:

I organise activities and tasks both within the project team and out in the health services. Communication ... encouraging people to take on this extra task ... it is a huge amount of work for them ... [often] without additional resources. So [I am] trying to keep them motivated ... [and convincing them to] do things that I know they would rather not have to be doing (Beth, 022).

She managed her staff carefully:

You try and look after your staff ... so they don't all burn out ... my team are working weekends ... putting in some big hours ... I don't want them all to fall in a heap on the weekend of Go-Live. There needs to be ... careful planning (Beth, 022).

Operational Readiness

The Go-Live Operational Readiness stage involved further testing of all core transactions in the system to the most minute level of detail because no agency could afford errors when admitting or processing a patient owing to clinical safety, legal, management and information governance risks. The ITSU's performance criteria specified completion of a patient admission 'in 90 seconds, filling out 20 screens' (Ali, 023) with instantaneous screen-refresh: 'we probably won't have [a] problem ... but a lot of the other [AHN] sites said it was a much slower system' (Ali, 023).

Code Freeze

Henceforth, there would be minimal scope for change to the computer code to modify the new PAS: 'Code Freeze means no more changes to the code in the application after that date. You are going to Go-Live with what's there' (Ali, 023). This milestone involved 'drawing a line in the sand' (Ali, 023), marking the end of the implementation team's testing and acceptance of the system on the agencies' behalf.

Dress Rehearsal

Ali described the Dress Rehearsal as: '[w]e have a go at everything ... simulate what we think is going to happen on Go-Live ... how we do it across 10 sites' (Ali, 023). She had 'walked through [the plan] ... at [ITSU]' (Ali, 023) but her team was awaiting ITSU's intentions as these would affect 'what we do, and how we disperse our staff and what activities we have to do manually when the system has been down for so many hours' (Ali, 023). The implementation was theatrically imbued with the language of performance. In a Team Leaders' meeting, Cass referred to problems with the community health service reporting capability: '[s]ome [problems] could be show-stoppers' (Cass, 021). Ali explained that Dress Rehearsal occurred:

... before Go-Live, before the show goes on ... everyone who has gone before us has said that they have usually run out of time and not done a good Dress Rehearsal. We've got a couple of weeks (Ali, 023).

Technological implementations are not neutral. They are more complex than a 'technical fix' (Berg 2001, p.154) or technology diffusion. In informing the social elements of organisations they become reified within work processes and routines. Ali reflected Berg's (2001) call for flexibility in implementation as she and her team imagined the Dress Rehearsal and the Go-Lives, the potential impacts of the events on the processes of data collection and the agencies' day-to-day operations and, hence, on patient care and what Heath, Luff and Svensson (2003) call making the technology 'at home in the world' (p.90). The HIM team was alert to the probable disruptive effects of the Go-Live on work-flow continuity to enable safe, efficient admission and discharge of patients, and agencies' abilities to access patients' medical records and related data. She explained the process:

The DoH [ITSU] people are going to ... get them [databases] ... primed and then we are going to do a Dress Rehearsal ... see whether we can still put patients into the system ... print a report, and [check] that all those ... things work properly ... And ... how long it takes to do a transaction (Ali, 023).

A pause: problems, solutions

Government-mandated, the technology was essentially a tool of the state. Viewing the PAS's technical functionalities through the collective lenses of purchaser agencies, Ali saw that its orientation overlooked some agency management-related requirements: 'a lot of this project is based around what DoH wants, not what agencies want' (023). She articulated a need for focus on functionalities:

... around workflow processes within an organisation and how an organisation and a [Health Information] Manager can better manage their service and feed through to their CEO and their Board about the way their organisation is operating. There is a big gap in the way [the new PAS] ... provides that sort of information (Ali, 023).

The new system had extra functionalities and, from the team's viewpoint, some unnecessary design complexities. Agencies throughout the state had adopted different modules of the new PAS: '[w]e're using more of the functionality than other sites so that might be why we're finding problems for the first time' (Ali, 023). The implementation HIMs remained concerned about the aforementioned impacts on billing of the new referral process. Billing in community health services had not been conveyed adequately by ITSU at the outset and this required rectification: 'This is a very complex process because referrals are connected to the activity ... a referral to a Podiatrist is different from a referral to a Physiotherapist' (Ali, 023).

Testing of system capacity for statutory reporting to the state's morbidity database was progressing despite concerns that the DoH-imposed schedule did not allow time to modify other 'defects and bugs in the system. We are having to do work-arounds' (Ali, 023). Systemic problems would also impede agency HIMs' other statutorily-mandated reporting; e.g. the system would not allow 'two primary diagnoses for malignancy' (Ali, 023), the production of certain clinical and financial-business reports, and critical updates to the casemix system's algorithms and rules. Excerpt 1 references critical points of consideration and planning in the Team Leader's meeting. By this stage, last minute issues were being resolved.

Excerpt 1 Team Leaders' (region-wide) videoconference

- One agency required two additional weeks to resolve user identification issues and log-on rights.
- The Chair advised that the team expected solution of the configuration issues within 10 days. Code Freeze would cause a two-week delay.
- The Chair advised that during the Dress Rehearsal the data copying process would give agencies an idea of timings and what to expect once operational. Potential approaches were mooted, including a Friday afternoon system shut-down to allow multiple background steps and testing by ITSU, before getting word to go in to the new system.
- The Chair ascertained each site's problems and level of readiness. Any scheduling change would be referred to the Steering Committee.

There were myriad problems and even the most prosaic technologies were important. For example, if the printers connected to a hospital's PAS did not "talk" to the computer system there would be no patient labels for identification bands, medical record forms, hard-copy test and investigation requests, and meal trays, thereby increasing risks of clinical and other errors, and incidents or adverse events following patient or document mis-identification.

Crossing the digital divide

In crossing the 'digital divide' (Mackenzie 2003, p. 369), the HIMs flexed constantly between stakeholders' interests, crossing, re-crossing and re-forming geographical, political, and technical boundaries. For instance, Beth talked about 'bridging between all the different players' and the HIMs' 'experience in dealing with different groups of people and knowing what is important to them' (Beth, 022). Her main skillset 'would probably be a master organiser ... and the ability to ... get the team environments working ... and all aiming towards a common end' (022, Beth). The HIMs ensured that relationships remained positive: 'We are constantly getting contacted by the sites, which is exactly what we want' (Beth, 022).

Whilst Beth and Cass also had extensive empirical knowledge of health IT, it was usually Ali who conveyed technical messages to the 10 Agency Leads. She dealt with the technical people to inform critical decisions about how the team could achieve completion by the Go-Live dates, and made decisions and recommendations. She spoke a technical language but deferred to the technicians' specialist knowledge: 'I am sitting with the technical guys more and more ... I understand some bits

but there is this huge knowledge gap that you don't get. And at the same time, the IT guys don't get our [HIM] bit' (Ali, 023). In meetings, she provided 'lay' interpretations of technical explanations.

Lead-up to Go-Live

A formality was brought to the implementation by means of the military-style descriptor, 'Central Command', for the Alliance headquarters during the planned Go-Live events.

Three weeks from Go-Live, Ali was still negotiating scheduling with ITSU. The politics of resourcing was insidious: '[t]his week's political agenda is to do with how many simultaneous Go-Lives we can afford and it comes down to budget ... the original agreement had that we would do ... two Go-Live weekends' (Ali, 023). The HIMs preference was for 'some control' (Ali, 023) to minimise risk to patients and agencies. Logistical constraints suggested scheduling a weekend Go-Live at most sites because of lower patient admission and discharge activity; however, there were staffing limitations. Parameters were set during the Team Leaders' region-wide videoconference: '[w]e can't [implement] more than four databases in a weekend' (Beth, 022).

The challenge of distance, always a potent force, affected scheduling and the deployment of Ali, Beth and Cass as expert resources to support Go-Live in the agencies. The Agency Leads had been offered someone from the implementation team 'out in the field' (Beth, 022). Logistical and resource challenges remained:

With four [implementations] on one weekend, we can't send four Beths ... She knows so much but we can't have her everywhere so we have to decide ... [which agency] is more likely to have problems ... Maybe we send me out to [Agency No.5] ... but maybe Cass would be better than me because she knows so much more of the functionality (Ali, 023).

Consonant with Hanken and Murphy's (2012) advice that post-Go-Live support is important, Ali considered sending her HIMs out to the agencies to problem-solve in the days after Go-Live: 'spend a day and a night there and pop into another site on the way back' (Ali, 023).

The Steering Committee's decisions

Ultimately, the terms of the Joint Venture Agreement had to be met and the implementation completed successfully, within budget, and on time, notwithstanding multiple stakeholders and the

distanciated implementation. Ali and the Alliance's EO conveyed to the Steering Committee details of progress, the PAS's limitations, and efforts to ensure planned functionality; some critical points of discussion are shown in Excerpt 2.

Excerpt 2 Steering Committee meeting

- The Chair observed that the agencies were governed by a timeframe in 'not a perfect world' (024). She reported that the Boards of Management's concerns were: ITSU's unrealistic implementation timelines and their effect on system integration and functioning; staffing pressures, and imposition of additional charges if there were Go-Live delays; and the new PAS's (reduced) reporting capacity.
- System limitations affecting the statistical and other reporting functionalities, highlighted three months previously by a state committee, had not been addressed by ITSU.
- The Steering Committee addressed downtime procedures, the agencies' plans for Go-Live and lines of communication, budgetary and financial requirements, and project and risk management issues. With regard to the latter, Ali drew attention to socio-organisational factors including avoiding a 'Go-live' coincident with one agency's scheduled accreditation survey.

A big gap

There was a disjunction between the state-wide ICT strategy and the quality of the PAS. The latter did not match the capacity and functionality originally conceived, e.g: '[a] big gap ... it doesn't have anything on [ABC]⁴⁸ [system interface]' (Ali, 023) which drove a financially-significant DRG. Other interface problems were ascribed to:

Politics ... and money ... If you talk to HIMs ... involved in the early planning ... they will all say that we've got a watered down version ... the deliverables are coming very late. We're the [nth] implementation [in the state] and we should have all been finished by this time ... including the clinicals [modules] (Ali, 023).

Looking back and looking forward

Ali commented that another rural region had no HIMs in its implementation team, and:

There were so many problems ... that ... took a year to get resolved because they didn't have that input. The PAS ... it is our domain, the area of our expertise, and why wouldn't you have HIMs involved in a state-wide project like this? (Ali, 023).

⁴⁸ A separate information system that needed to interface with the new PAS.

The HIMs started succession planning for ‘what happens post-Go-Live and how do we manage a number of activities’ (Beth, 02) to ensure the agencies’ future self-sufficiency with the new system.

Commentary: tensions, conflicts, contestations

This implementation was enabled by the HIMs’ articulation work. They negotiated intensely, amid subtle economic and political contestations. One disjunction involved the financial burden on small agencies of state-imposed standardisation. As the Chair of the Steering Committee indicated, the agencies did not ‘have any say at the end of the day’ (024). Pragmatically, she favoured standardisation and if new IT systems ‘worked the way that they’re intended to work it would be great, but my concern is that it’s not perhaps quite as easy as people contemplate’ (024).

A political conflict involved the ITSU team’s techno-bureaucrats and the HIM implementation team who operated on the purchasers’ behalf. This concerned: Go-Live timings; resourcing for User Acceptance Testing; lack of consultation in design of referral functions; poor or absent report, referral and billing functionalities; and universal health IT implementation problems such as inadequate staff resources and too-tight timeframes.

When asked to reflect upon the knowledges and skills that they brought to this implementation, the HIMs separately reiterated the facts of knowing the systems and processes, applying this knowledge, and mediating the worlds of the agencies, the technology, and the Alliance. For instance, ‘in a project like this, HIMs are vital ... because of what we’re trained in and know how to do’ (Cass, 021).

A year later

A face-to-face, in-depth interview was conducted 15 months post-implementation with an HIM-Agency Lead (072). As requested by the implementation HIMs, 072 had reviewed her agency’s systems and procedures, systematically previewed each PAS module, and ‘put some dummy patients in’ (072). She entered core structural data for her agency’s hospital and (community) health services, instructing users to ‘[t]ry to break it’ (072). She had engaged in ‘a lot of people management’ (072) to effect change, and made multiple agency-based decisions including system

access, and viewing and action rights. In the early stages, she had harboured 'grave fears about ... whether we [via the new PAS] were actually going to function' (072). Differences in mapping data and tracking medical records in the new PAS caused the 'biggest fear' (072).

The end result

The new PAS created considerable work for agency HIMs; however, the implementation team spoke 'the same language [and] kept us all sane and functioning' (072). Ultimately, 'I don't think it changed our lives dramatically' (072). The new system had probably 'made life harder because you couldn't [any longer] produce those detailed reports for ... surgeons' (072). Notwithstanding this:

... given our fears going in, I felt like it was a success because we didn't have things fall over ... people were getting what they needed when they needed it, and patients were getting treated and we weren't causing a problem ... we were just so happy that it worked and we could still admit people and do [hospital statistical] balances (072).

Reality and 'the limitations of the system kicked in ... trying to send reports was a bit of a nightmare' (072). Human resource-wise, 'we had a lot of exhausted staff' (072). Eventually, 'it just worked ... But did the hospital gain anything from it? I don't think so. Not in a positive, workflow kind of a way' (072).

Case summary

The intent of this case study was to observe the implementation work of the HIMs rather than focusing on the dichotomy of failure and success of the new PAS. It became evident in the later stages of the implementation, however, that the new system was not perceived by the agencies' representatives including their HIMs and the members of the Steering Committee, to be a significantly improved product. Problems arose with regard to its poor functionality for certain reporting and outputs. This was reinforced, post-implementation, by 072's experiences in her healthcare agency: the implementation had created a great deal of work at agency level, caused problems with statutory reporting, and lacked the capacity of its predecessor to produce required surgical reports. It is useful here to recall Berg's (1998b) pragmatic observation that:

Those who order new information technologies ... are often not the same people who work with the technologies, and often those who put together the requirements are not the same people who do the actual design (p.458).

The implementation of what the HIM team agreed was a singularly mediocre product was highly socially negotiated in 'a real world, real time activity' (Rooksby, Rouncefield and Summerville 2009, p.560). The HIMs' linking of system with hardware reflected Tjora and Scambler's (2009) notion of 'connecting tissue' (p.523), introduced in Chapter 2. Reminiscent of Hutchins (2001), their implementation was undertaken 'in the wild' (p.2068), across distance, and within a pre-determined but moderately flexible timeframe, and they undertook what Hutchins (1995, 2014) and Mackenzie (2003) describe as imagining work. In other words, operating from distance, they (re-)balanced tensions between the transferrable, mobile knowledge of the new PAS and its processes, and the knowledge embedded in the agencies' social systems. They maximised the PAS electronic infrastructures, accounted for differing organisational characteristics, and ordered systems and knowledge within and across distance in the region's 10 hospitals and associated healthcare agencies. Healthcare IT, including technological implementations, is reflective of the outcomes of stakeholders' inputs and interpretations of the software, and is entrenched in work-, professional- and institutionally-related social transformations (Berg and Winthereik 2004; Coiera 2004). In the current case, the HIMs' implementing involved multiple trade-offs in order to turn the old (sometimes superseded) systems and processes into the ([re-]constructed and, in this case, state-imposed order of the new. The HIMs operated across multiple boundaries in balancing the inevitable tensions between the agencies' desire for an effective system and the realities of imposed, standardised systems.

Chapter summary

The findings, reported here and in the two preceding chapters, reflect different aspects of HIMs' professional work. They converge to provide a hologram of the HIMs' CSCW and articulation work in multiple social worlds across the healthcare sector whereby they constantly engage in negotiative, collaborative, ordering work to create or maintain reliable systems, processes, and classifications that are ultimately purposed to enable their (re-)construction of the patient into data that are the official, sanctioned versions of the "truth".

Chapter 8

Discussion and conclusions

Introduction

This final chapter addresses the significance of the findings from this study of the professional work of Australia's HIMs who are dispersed, within the metaphorical health information management ecology, throughout the healthcare system. This dissertation has described original research which fills a major gap in the knowledge and understandings of the professional roles and work undertaken by HIMs in Australia, and provides a theoretical perspective of the profession and its work.

An exploration of the professional work of the nation's HIMs was undertaken with the intent to address the overarching research objective, specifically to achieve an understanding of health information management in Australia. Central to this research were triangulated studies, undertaken using qualitative methods, of the phenomenon of the profession of health information management. The profession was examined within the framework of a collect of key, somewhat inter-connected societal and political drivers that I have identified as influencing and shaping its roles and discourses. The triangulated findings from the Australia-wide interviews, and the three case studies, are seen to be consistent. For example, the HIMs' implementation of ICT systems, and their classification, standardising and within-network professional work all indicate the need for and utilisation of a core, specialist knowledge- and skills-base. Individually and collectively, the four sets of data gathered from HIMs throughout the Australian healthcare system provided common themes and very useful insights into the HIMs' work. As this final chapter progresses it will become evident that the findings call into question assumptions concerning visibility of the profession. They also present an emerging picture of the HIMs' contributions to the healthcare system, and prompt questions and discussion about the profession's future direction.

Firstly, I draw together my findings to address each of the research questions, viz:

1. What are the key societal and political influences and drivers that have shaped contemporary Australian health information management?
 2. What are the implications for Australian HIMs, for the shape of health information to be managed, of evolving organisational arrangements within the healthcare system?
-

I then consider the significance of the findings for HIMs and, subsequently, explore three potential pathways for the profession: supersession; displacement; and opportunity. The limitations of the research are then addressed. Finally, in presenting the conclusions, I re-situate Australia's HIMs within the framework of the meta-principle that scaffolds this study and derive a new narrative for the profession.

Social and political forces shaping Australian health information management

The centrality of the medical record

This dissertation began with the appropriation of Foucault's (1973, 1979, 1980) premise that since the 18th century the medical record and its categorisations and classifications, at individual- and population-levels, have been positioned centrally within Western medicine and have underpinned the modern hospital. Within this context, I have revealed that several critical societal and political drivers pre-empted the establishment and further development of the profession of medical record librarianship which morphed nomenclaturally over time into health information management. The key impacts of these influences on 21st century HIMs' work are now summarised in the context of the findings.

Enabling scientific medicine

The findings point to important connections between scientific medicine and health information management since the latter's inception. The contemporary 21st century HIMs' systems development and managing, classifying, analysing, and bureaucratising, support clinical work and research, and contribute as an underpinning to EBM and EBH. They manage the retention-, access-, security-, and other requirements for multi-form medical records, data items, datasets, information privacy, and service-related programs. Consistent with their own professional ethical code, their trustworthy, custodial work privileges the protection of health information privacy. Behind-the-scenes, the HIMs support and enable scientific medicine through engagement in auditing and the performance of health information management in clinical governance, population health data analysis, epidemiology, clinical trials, and clinical database management.

The ubiquity of standards

This study shows the ubiquity of standards in the Australian HIMs' world. It is apposite here to recall the complexities inherent in the HIMs' development and applications of universal standards in their efforts to create order. Undertaken across different social worlds, their constant standardisation exposes ongoing tension between order and disorder. It transpires that their standardising is multi-purposed, including to: improve interoperability for sustainable, safe EHRs, health systems, and data; frame health information and medical record structures and content; guide and re-invent the dominant health classifications; and develop automated classifications. For each care-type or arena of work in which they engage, the HIMs apply expert working knowledge of: prevailing state and national standards, guidelines, laws and regulations; health information science, practices and technologies; classificatory practices; and healthcare financing models.

Classification

We have seen that the HIM-Coders' specialised classificatory practices transform, re-organise, re-define, and standardise patients and their illnesses and treatments into code. In so doing, they undertake what Bowker and Star (1999) describe as a gatekeeping role which, implying a degree of social construction of diagnostic codes, gives them license to determine what becomes official fact. Recalling Berg's (1996b, 1997a) conceptualisation of the medical record as mapping the patient's trajectory and re-constructing the present through mediating clinicians' work, we observe the significance of HIMs' abstraction of the (embodied) patient from the medical record and of storifying him or her in codes purposed ultimately for critically important clinical and societal applications. This practice is supported by Latour's (1996) theory of the object which may ascribe to the UR an embodied status abstracting the patient and his or her illnesses and treatments. The findings of the current research reinforce Berg's (1997a) notion that the ICD-10-AM classification is a formal tool, an atlas of the patient's body. In making complex decisions during abstracting, and in applying the classification and its binding standards, the HIMs reinvent the patient and his or her clinical outcomes in immutable, coded and statistical form. This finding extends Berg's notion considerably and forces us to recognise the HIMs' hitherto undocumented, unseen role in abstracting and re-inventing the patient.

The HIMs unanimously perceive classification to be an essential component of their professional skillset. Notwithstanding their acknowledgement of the inevitable automation of elements of clinical coding in a future fully-EHR environment, they predict an ongoing need for human decision-making in classification and associated auditing processes. This is necessary, they observe, to effect what they consider to be accurate interpretations of classificatory complexities and nuances based on a plethora of constantly changing rules, standards, and government policies. These facilitate and necessitate the HIMs' continued accommodation of both scientific medical, and managerial, interests, specifically emerging clinical practices and technologies on the one hand and, on the other, changes to healthcare funding systems and reimbursement rules.

The HIMs' operations, decision-making, and interpretation of these multiple standards and precedents are undertaken in a dynamic environment wherein they balance shifting interests and disciplines. Thusly, they produce a constructed truth from the mess of raw clinical statements as there is, indeed, no fixed truth.

Managerialism and management

The findings indicate that Australian healthcare's business imperative imposes ever-increasing demands on, and expectations of, HIMs' performance. Evident throughout the healthcare sector, this phenomenon is imbued in Beck's (1992, 2013) and Lash's (2002) risk society and the subsequent information-centric network society and its concomitant dependence on access to information and focus on surveillance. Executives and Boards of Directors in 21st century Australian healthcare facilities are heavily reliant upon timely health data and their informed interpretation by HIMs for organisational and clinical performance accountabilities, and strategic and quality management functions. These requirements necessitate the HIMs' re-focus on organisation-wide performance measures and audit programs in their efforts to afford informational transparency and to manage governance of data integrity. Following their actuarial reading of the medical record the HIMs perform complex 'rendering practices', in the manner described by Lynch (1985), in accumulating, re-working, and 'qualculating' (Thrift 2004, p.584) the scientific facts of patient care. This involves quantitative actions; importantly, however, it also implies a qualitative dimension to the HIMs' establishment or construction of what are inherently subjective interpretations of the "truth" and the perceived integrity of the data that they translate and re-produce as the sanctioned

versions as theorised by Smith (1990b). These dynamic practices are synergistic with Giddens' (1991) notion of (re-)embodiment of the patient, and the functioning of Latour's (1987) accumulation cycle as seen in the HIMs' constant re-calculation and rendering of health data into scientific facts. This study reveals that the HIMs' conversion of mess into order remains hidden, frequently in the background, as their calculation needs to remain invisible to hide its qualitative, interpretive, arbitrary, and historical dimensions.

We have seen that healthcare facilities rely upon the HIMs' data abstraction, analysis and translation to meet institutional accountabilities. The public and private sector hospital funding models also necessitate the HIMs' ongoing scrutiny of cases and codes for revenue justification purposes in healthcare organisations and health insurance funds. These latter functions are situated in a world of changing relationships to money that necessitate the HIMs' confrontation of the profane (the mess) in traversing the space between the inscribed medical record (and its embodied patient-subject) and the classificatory and interpretative processes that effect a seemingly magical conversion of the patient into statistics, information, and dollar values. These ABF requirements have, in turn, accorded HIMs greater prominence in the hospital sector.

Bureaucracy, technogovernance, and power

Embedded in (electronic and paper) files and systems, the HIMs remain driven by the efficiency and expertise characteristic of Weber's (1963, 1991) bureaucracy. In the era of post-bureaucracy, Martin and Sinsky's (2016) concept of technogovernance is also prominent in the HIMs' expanding authoritativeness in the realms of statutory and rule-based aspects of medical record documentation, and data management and applications including for organisational governance, funding, and performance purposes. This is seen, for instance, in the work of The Royal's HIMs, the SICC members, and many other HIM-participants engaged in different parts of the healthcare system, including in government departments. The findings demonstrate that many HIMs are progressing beyond the silos of hospital HISs and positioning themselves in critical, health information-centric roles that are crucial both to their organisations and the healthcare system. Their work is shifting to incorporate increased professional boundary-crossing, organisation-wide purpose, and accountability-focused discourse. Working across-organisation and across-components of the wider system, they are assuming an expanding health information stewardship

role. In turn, these re-alignments and re-positionings are, in some environments, slowly visibilising their work and propelling them into new workspaces and new accountabilities. For example, whilst retaining their responsibilities for health information and systems, they are dealing with the shift from paper to the DMR and the EHR; notwithstanding this technologisation, the mess of the UR remains to be ordered and purified. Whilst the electronification of medical records increases clinicians' responsibilities to produce more structured online inscriptions, and HIMs are beginning to undertake a role that incorporates curation of translations produced by clinicians and technologies, their work retains a strong data and systems focus.

The HIMs' bureaucratic work exposes an associated element of power, evidenced particularly in the contexts of their expert understanding, interpreting, and controlling of access to health and revenue data, and health information systems. This is demonstrated in different ways including their translation of the patient into what Rosenberg (2002) describes as the bureaucratic space of codes and statistics. We saw in chapters 5, 6 and 7 that their transforming and translating make sense of and re-purpose health data, further penetrating the bureaucratic space with products such as KPIs, CIs, and other measures of individual and organisational performance.

Some HIMs also hold a power devolved from expertise and exacerbated by a workforce shortage. Ultimately, their bureaucratic administration affords position-based prestige commensurate with their propensity to form alliances, and to control access both to information and their own expert advice.

The phenomenon of ever-increasing technologisation

We have seen that since its inception through to the 21st century, and irrespective of workplace, the profession has been embedded in technologies. The HIMs' involvement is seen to be operationalised through Bijker, Hughes and Pinch's (1987) triad of physical and electronic artifacts, processes and activities, and knowledge and skills, introduced in Chapter 1. Functioning in a rapidly changing technological environment, Australia's HIMs reside in a Latourian 'technoscape' (Lash 2002, p.55) of multiple technologies including the DMR, EHR, classifications, databases, and systems, including for decision-support. Utilising technologies to achieve their objectives, they

adapt to and adopt continuing technological change; some, however, express the need to adapt at a faster pace.

We have seen that some HIMs, especially in hospital environments, convey what might be perceived as an omnicompetence across the fields of health data, classification, system implementation and management, and specialised health information management. This is seen to the extent that they implement, manage, and boundary-cross, utilising local systems but generally relying upon computer science experts for background technical support. They are assuming a meta-role of information access and, concomitantly, experiencing increasingly higher levels of risk observed in greater volumes and mobility of health data, the challenges of managing access amid increasingly large and linked databases, and the prospect of “big data” whereby there accrue too many data items to manage. The risk extends to the HIMs’ need to balance researchers’ interests in the data with the data-subjects’ rights to privacy, the obligations of the organisation, changing standards and laws, and the environment of constantly reinventing technologies. Indeed, we may conclude that characteristic of the risk society wherein conditions change more rapidly than members’ capacities to adapt, the profession’s accommodation of technological change appears to be gradual in some respects and more immediate in others (e.g. classificatory change).

It is useful to mention that the HIMs’ technologising work in digitising the medical record simply produces an inert DMR, as opposed to the dynamic EHR. The mess of the paper record is retained in the DMR, whose primary benefit is mobility. Some benefits likely to accrue to HIMs from EHRs will be increased legibility of the UR and easier negotiation of its components, and some degree of auto-classification by clinicians. Importantly, whilst HIMs will continue in the role of information production, this is expanding to include management of technologically-mediated processes for accessing data.

Dealing with technology’s limitations

Counterpoised to the HIMs’ reliance on technology are technology’s relentless unreliability and its frequent inability to meet their requirements to achieve their data translational objectives and needs. These technical limitations expose a gap between the HIMs’ (and others’) expectations of ICTs and the reality of delivery. The underlying difficulties are reflected in the disappointment and

frustration conveyed by HIMs Australia-wide, at The Royal, and by regional PAS implementation team. This all leads us to conclude that the HIMs' ordering has expanded from the disorder of the paper medical record, to incorporate technologies' constantly shifting operations and capacities. In other words, the point of gravity of the mess and disorder has shifted. The HIMs are now mediating between individuals and organisations who require answers and coherent information, and (often) temperamental technologies whose unpredictability and limitations necessitate constant work-arounds and temporising characteristic of articulation work.

Constantly managing risk

Health Information Managers are faced with a rapidly changing technological and bureaucratic environment consistent with Beck's (1992, 1994, 2013) and Lash's (2002) conceptions of the risk society. The HIMs' world is saturated with increasing amounts and types of data, information, and systems that enable clinicians' and others' healthcare work to be informed in different ways. Virilio's (1999, 2006) caution about the exacerbating intrusiveness of technology and its false heroisation as converting mess to order, resonates with the pragmatic observations of some participants regarding the importance of the human, the social. The HIMs constantly juggle and manage risks, including those attached to data integrity, health information privacy, and the aforementioned technological limitations. Pressures exerted in the risk society are exemplified in the rationalisation (and also managerialisation) of healthcare including performance, resourcing, and quality of care accountabilities, and the effects of the fast-paced information society.

Protecting patients' interests

We have seen that contemporary HIMs unanimously privilege their trustworthy position and the centrality of privacy in their dealings with health data and information. Trust is constructed as truth. The HIMs' performance of trust is defined through their authoritative interpretations of and compliance with the legally enshrined conditions governing access to health information and medical records and, separately, through their protection of patients' health information privacy. The latter is exemplified, on a large scale, in the HIMs' handling of the 10 databases in the case study of the PAS implementation described in Chapter 7.

Commodification: an effect of the economic-financial dimension

Importantly, many healthcare facilities depend on the HIMs' expertise for their business continuity and survival. We have seen that in fulfilling the seemingly ever-increasing objectives and demands of state governments, health insurance companies, and hospital proprietors and Executives, HIMs commodify patients' diseases and operative procedures as units of financial currency. Their bureaucratic and standardising routines have morphed into critically important operations for healthcare agencies because of the increasing and compelling economic-financial dimension. The value of their ordering, and production of reliable information, has escalated to the establishment of a reimbursement gateway through their DRG and other revenue-generating data.

Implications of evolving organisational arrangements
The core knowledgebase

The findings reveal four core, inter-dependent domains of HIMs' knowledgebase and work: health information management (including privacy); health ICT and informatics; health classification; and health data analysis and research. The HIMs' career trajectories reveal flexibility and between-domain movement, although the expert nature of the work means that some specialise in one domain whilst leveraging their other domain knowledges in support. This combination of transferrable, professional knowledges and skills, highly valued by the HIMs themselves, enables them opportunistically and legitimately to take up positions in related areas across the spectrum of healthcare information.

The evolving HIM role

This study reveals that since its inception in Australia in 1949, and influenced by the confluences of the societal and political drivers identified herein, what is now known as health information management has changed significantly. It has expanded from a paper-centred, custodial and classificatory hospital role to a healthcare system-wide, translational, analytical, financialised, electronic data-focused role. The image of a hospital basement-dwelling profession has faded. Whilst retaining a firmly embedded hospital presence, the HIM role now penetrates multiple arenas: government departments; statutory bodies; epidemiological, clinical trial, and medical research organisations; health screening bodies; health ICT system and software development and vendor companies; health insurance funds; community health and primary care services; and EHR

and classification development bodies. It permeates locations throughout the healthcare system wherein data are collected, managed, classified, analysed, reported or applied, and where supporting ICT systems and technologies are developed, implemented, and used. The profession has evolved well beyond its Medical Record Department origins described in Chapter 2, and what was referred to colloquially by some study participants as the ‘traditional’ HIM role.

Possessed of transferrable and flexible professional knowledge and skills, many HIMs have assumed positions in new domains across the spectrum of information in healthcare. The traditional custodial, classificatory and medico-legal roles continue to expand into new occupational spaces to embrace technologisation, system design and implementation, data analysis, and health business, clinical governance and epidemiological roles. The ‘traditional’ hospital HIM role has morphed into a ‘contemporary traditional’ role or, for many participants, an ‘extended traditional role’, the latter involving enterprise- or organisation-wide responsibilities.

The ‘contemporary traditional’ role

Notwithstanding this momentous shift, some hospital HIMs remain immersed in a contemporary version of the ‘traditional’ HIM role, *albeit* far more rapid-paced and technologically-oriented than its earlier iteration. This reflects new health data reporting requirements and funding models, and the impacts of accelerated standardisation and technologisation. In the mix, also, are the effects of consumers’ gains in health information privacy and rights to access their medical records. Engaging in CSCW, these HIMs extensively problem-solve and undertake work-arounds characteristic of invisible articulation work.

The ‘extended traditional’ role

This incorporates the components of the ‘contemporary traditional’ role plus the staff and system management responsibilities for a wide range of across-institution and across-network, non-clinical patient services. Engaging deeply in articulation work across multiple boundaries, these HIMs act as a resource to stakeholders in health information, including their hospitals’ Executives. Some experience increasing intra-organisational visibility.

The 'health information globalisation' role

The findings reveal a further transitioning to a new, 21st century role involving increased data analysis and management, and dispersed reporting. This is partly contingent upon functional overlaps that create a multiplier effect from the 'extended traditional' and 'contemporary traditional' roles. We recall here that Foucault's (1980) description of the dissemination and use of hospital and related data at population level, globalised for societal benefits, serves as the model for my conceptualisation of what has emerged as the HIMs' 'health information globalisation' role. Imbued in technologies and dominated by standards, this role is significantly more complex than extant definitions of HIMs' work. In their local and inter-sectoral ordering efforts, the "new" HIMs constantly manage and mobilise data and files, implement and manage supporting infrastructures, produce information, and undertake heterogeneous, co-operative scientific work. They establish internal and external strategic alliances to facilitate development of core boundary objects critical to their organisations' responsibilities and interests. I intend 'health data globalisation' here to imply knowledge transaction; in particular, these HIMs undertake complex, health system and data transforming that facilitates intra- and inter-organisational knowledge sharing and transmission. Regardless of their positioning within the healthcare system, many HIMs have gravitated or are transitioning to the information globalisation role.

The HIMs extensively and co-operatively engage in the design and implementation of the work-supporting information systems that constitute CSCW and perform complex articulation work for the remote patient who they see as the purpose for their performance. Pursuant to Berg's (1997a, 1997b) theory that the UR remains a key space of clinical performance, the findings invite an analogy between Waitzkin's (1989) concept of the doctor-patient encounter and the HIM-participants' encounter with the patient. The material point of difference, as revealed by this study, is that the HIM-patient relationship is distanced, excepting for those HIMs who work in clinical trials or facilitate patients' access to their medical records. We have learned that most HIMs engage in a virtual encounter to re-embodiment and mobilise the patient in datafied, codified form. Importantly, they also undertake extensive, largely unseen infrastructuring work exemplified in the case studies of the across-region, multiple PAS implementation and the SICC's intensive reconstruction of the ICD-10-AM classification. This infrastructuring involves their designing, (re-

)constructing or implementing health information infrastructures such as PASs, databases, EHRs, and classifications to enable multiple practices.

The HIMs see themselves as imbued in rapidly changing technological and bureaucratic environments saturated with increasing amounts and types of data, information and systems that enable clinicians' and others' healthcare work to be informed in different and better ways. They constantly problem-solve and manage risks to data integrity, health information privacy, health information and system (including EHR) governance, and the capacity of available technologies to support their objectives. To these ends they audit, establish policies, guidelines and procedures, and educate their staff and colleagues including clinicians.

Frequently self-describing as a 'resource' of knowledge and information, the HIMs express confidence in their expert knowledge and skills, and their understandings of health data and information. Operating across multiple boundaries, they convey universal awareness that the visible products of their largely background work are highly valuable, and necessary to power and support the healthcare system. Positioned at the socio-technical interface, they emphasise the centrality of the human element in systems, system design, and classification and deal with technology and diverse interests and stakeholders. Commonly they see themselves, in what we conclude is their boundary-spanning role, as a bridge or the 'in-between': they perform and liaise at the interstices of the healthcare system's clinical (including research), managerial (including financial) and IT worlds, and the external worlds of the government, statutory authorities, IT vendors, and health insurance organisations.

On being marginalised

The visible products of the HIMs' work are needed to undergird the healthcare system. Paradoxically, however, as they convert the inelegant mess of raw data into elegance and truth, the HIMs' behind-the-scenes cleansing, classifying, analysing and system-building renders them seemingly marginalised. Whilst they necessarily continue to translate data into information, their role has in fact grown well beyond this. It remains to be seen whether their expanded role of managing information production systems and outputs will increase their visibility. Their work continues to reflect Douglas' (1966) notion of dirt as disorder and a symbolic by-product of the

classification and purification of disorder into order, and Durkheim's (1995), and Durkheim and Mauss' (1963) notions of profane and sacred. As we have seen, the HIMs now operate at a different level of social-organisational order: their production of the sacred now involves the curation of ICT systems and their relationships and products. We recall the inevitability of mess and Timmermans and Berg's (2003a) view that technologies, absent innate rationality, depend upon real-time, messy work to survive and thrive. This is the work undertaken by HIMs in institutions throughout the healthcare system, and as seen in the case studies of the SICC and the Plains Alliance's PAS implementation. This intense involvement in ICT (in)commensurability and information reconciliation introduces the need for intensive technologising to (re-)create and transform good quality data into valuable information. Again, it references the risk society and, especially, the information-centric society that values high volume, high-speed data.

The challenges of disentangling

The profession's performance of extensive disentangling, classifying and re-purposing of health data, from the point of production of the patient through to the wider healthcare system, forcefully exemplifies and, arguably, pushes beyond the confines of Berg and Goorman's (1999) law of medical information. The HIMs' mostly invisible intermediation work transforms health data and information from their disorderly origins within the medical record and reconstitutes the patient into mobile, ordered data, codes embedded in statutory reports, and other devices. As we have seen, these outputs extend far beyond the sanitised service data provided for earlier hospital managements. In performing critically important boundary work, *albeit* largely behind-the-scenes, the HIMs now do far more than purify messy data. Their creation of order from disorder has complexified and intensified. In the current era, their mobilised data infiltrate the healthcare system in multiple forms as official facts to support what Smith (1990b) identifies as the state's 'relations of ruling'. The locales and boundaries of the HIMs' work are changing and expanding, creating greater challenges: their bureaucratic, qualculative, informatics work continues to involve turning paper- and electronically-based inscriptions into information but, significantly, the findings demonstrate that it increasingly involves managing information production systems, and the reconciliation and dissemination of critical informational outputs.

Modelling health data-knowledge translation

Notwithstanding dissimilarities in distance, space and environment, the HIMs share common foci: on the linear progression of raw data through Baker and Bowker's (2007) 'data-information-knowledge trinity' (p.131); in applying standards to transform data into information which subsequently traverses to a 'domain knowledgebase' (p.131); and in organising and making sense of the data, including attending to issues around their collection and subsequent impacts on the domain knowledge. The difference arises in the medium: electronification of health data and information is creating new challenges in new spaces. Further commonalities materialise, extending to the HIMs' perceptions of the fundamental importance of metadata and the questionable integrity of data that emanate from different sites. In essence, they arbitrate among different sources of truth, and privilege some truths over others because they are more consistent with prevailing norms and views, and with the stakeholders' needs and priorities.

The concerns expressed by hospital HIMs about the quality of doctors' documentation in the medical record reflect Garfinkel and Bittner's (1967) durable observations from half a century ago. The challenges of abstracting and coding from records that inhabit different formats, media and structures, mirror those of Baker and Bowker's (2007) scientists. Furthermore, the worries expressed by the HIMs inhabiting different information ecologies in other parts of the healthcare system are similar to those of the scientists: these relate to the quality, consistency, and inter-comparability of aggregated and coded health data for the purposes of interpretation for myriad applications in large-scale health service and system planning and financing, population health, and disease monitoring.

Boundary spanning

The HIMs have, therefore, evolved from their origins in the acute care hospital sector, wherein they held allegiances to both the medical and the managerial (corporate) structural interests. In the 21st century they inhabit an across-healthcare universe. They self-perceive as the interface, or in-between, constantly bridging tensions between the dichotomous management and clinical social worlds which frequently present new objectives and relationships with resources, decision-making freedoms, and bureaucratic processes. We see that Australia's HIMs reside in Berg's (1998b) border zone between technology and 'human work' (p.457-8), wherein they span the gap between the

creators of the data (clinicians), system technology designers (IT specialists), users of the data and systems (clinicians, researchers, healthcare managers), and the many legitimate external stakeholders such as governments, statutory bodies, health insurance funds, IT vendor companies, and other entities with whom they ally and interact on behalf of their organisations. As boundary spanners, they inhabit the critical interstices between the organisation's Executive, business and finance, clinical, and IT worlds, and operate connectedly across what Star (2010) describes as the shared space constituting the boundaries of key social worlds. Acknowledging Star's (1990) theorising that multiple memberships and multiple marginality offer a source of power, we observe that the HIMs occupy a highly contested zone characterised by continuous environmental (organisational) and technological change, and increasing negotiation between and accommodation of the myriad stakeholders' vested interests.

Gatekeepers to fieldkeepers

Australia's HIMs are shifting from translation work to reconciliation work. They continue to negotiate and engage with multiple social worlds to create (and re-create) boundary objects to achieve the objectives of their employer organisations but, importantly, they now decide what is health information. I contend here that they have moved from a 'gatekeeper' (Star and Griesemer 1989, p.389; Bowker and Star 1999) role⁴⁹ to an expanded and more challenging "*fieldkeeper*" role. This subsumes their gatekeeper role involving the production of translations of the patient and boundary objects. In this new, wider role of *fieldkeeping*, they bridge multiple boundaries to manage disorder into order and acceptability. Undertaking background work, they transition boundary objects and systems into boundary infrastructures, standards, and processes. This is seen, for instance, in the case study of The Royal Healthcare Network, wherein they strategically negotiated to translate organisation-wide data chaos and disorder into orderly informational outputs critical to the network's operations, and legal and compliance obligations. Significantly many HIMs, Australia-wide, believe that the demand for (what I describe as) their reconciliation work is expanding.

⁴⁹ Or 'guardkeeper' as described by Timmermans and Berg (2003a, p.42).

The problematic of (in)visibility

Immanent in the HIMs' work is a series of contradictions. Broadly classifiable into the 'sacred' and the 'profane' (per Durkheim and Mauss 1963, p.86), these basic paradoxes fundamentally illustrate the complexity of their work. They engage in the irrationality of Egan's (1994) shadow-side of the organisation, their translation inherently politically problematic. The problem of invisibility runs counter to the experiences of those HIMs who - particularly in healthcare institutions and research environments - experience a visibility within and to the organisation, indicating to them that their work is highly valued internally.

The paradox for HIMs is that because they reconcile competing truths into a manageable single truth, they tend to reside in the background. Their boundary spanning role continues and increases. Whether this, and the ongoing technologisation, will change their visibility remains a moot point. I venture here to extend Muller's (1999) theory (introduced in Chapter 3) that sometimes visibility may be contingent upon who views the work, rather than the work itself: notably, the current study indicates that in the case of HIMs, their locale or the localness of the work may increase their visibility as seen at hospital and AHN level in their ABF data analysis and reporting. The experiences of a number of the HIM-participants indicated that this principle of invisibility is shifting for them because of new technologies, and new professional responsibilities and practices. We are aware that the techno-centric shift and associated privileging of information in the fast-paced network and information societies are preludeing a world of machine (computer)-based, networked surveillance. These suggest attendant risks, including the remote possibility of EHRs obviating the ongoing need for HIMs and introducing redundancy. This leads us to consider the ramifications of the findings for Australia's HIMs, in two potential pathways.

What does this mean for HIMs?

Pathway 1: gravitating to supersession

The findings include some indicators of a digital usurpation of HIMs. This could support a view that, absent the profession's continuous and flexible adaptation to changing technologies and healthcare system environmental factors and requirements, the HIMs may ostensibly gravitate to

supersession. In light of the findings of the current study, concerning the embeddedness of the HIMs' work within Australia's healthcare system, this pathway appears to be unlikely.

Pathway 2: displacement

Digital and electronic medical records

The progressive elektronification of health data and medical records, and employers' expectations concerning clinicians' direct data-entry into EHRs and other systems, inevitably engage clinical staff and HIMs in new and different ways of working. The workplace effects of medical record digitisation, seen in substantial reductions of hospital HISS' administrative-clerical staff establishments provide, as indicated above, an indicator of potential digital usurpation of HIMs and the impact of the EHR on their responsibilities. Their focus is shifting to management of professional (HIM) staff, and technical staff. There is no evidence from the current study that this will negate the need for the many facility-wide staff in non-clinical services managed by HIMs in their 'extended traditional' role. Nor is there evidence that it will obviate the need for myriad health information management functions that constitute their meta-HIM activities⁵⁰.

Notwithstanding the trend towards hospitals' adoption of the DMR in several jurisdictions, the evidence indicates that this is a stop-gap measure; once the EHR becomes widely operationalised, digitisation (through scanning) must inevitably follow the paths of paper and microfilm to become a semi-redundant medical record storage technology, retained in the longer term for residual paper items. This pre-empts elimination of much of the HIMs' operational management of this singular function.

A number of factors continue to force the HIMs' displacement from their contemporary *status quo*. One such risk concerns the substitution of some HIMs' work by human (clinicians, IT workers) and non-human (technological) actors. We know, from international and local experiences, that the

⁵⁰ For example: ensuring the integrity of patient identification; electronic form design; data quality control; system design and implementation; database construction and management; documentation audits and audit trails; management of information privacy; data retrieval and analysis; reporting (internal, external); and facilitation of legislated access to EHRs.

establishment of large-scale EHRs is costly, time-consuming, and prone to failure⁵¹. In the Australian context, HIMs in the current study suggest that it will take decades to achieve successful EHR implementation nationally. This lead time provides them an opportunity to prepare and it would seem wise to address this immediately (as demonstrated by some senior HIM-participants), simultaneous with their continuing, active participation in the electronification process.

Technological preparedness

The findings indicate that many HIMs privilege the functional rather than the technical components of health ICT. A small number perceive this as a point of professional knowledge weakness that warrants the accrual of additional skills for managing a greater breadth of health ICT functionalities. This presents challenges for education programs in the context of the profession-entry (graduate) professional competency standards, and for professional development in the intermediate and advanced competency standards. The latter, particularly, challenge the professional association's capacity to foster HIMs' ICT up-skilling throughout their careers. Arguably, the HIMs' capacity to meet emerging professional and technological challenges requires ongoing individual and collective preparation for a future-ready HIM workforce. A failure to address these challenges would predispose the profession to an element of workplace ICT obsolescence at the level of individual HIMs.

Automated coding (classification)

Based on the findings of this study, the dispersal, to doctors and electronic systems, of core HIM functions will inevitably render obsolete the work of small numbers of HIM-Coders (and large numbers of the lesser qualified Certificate Coders), especially in low-complexity casemix environments. Recognition of conflicting political interests in the automation of health classification work must inform discussion on this issue. We know that the key oppositional players are the payers (governments, health insurance funds) and the providers (hospitals and healthcare services). The former are focused on minimising payments to providers and patients and, arguably in the case of state and territory governments, minimising public sector costs and minimising hospitals' casemix-based financial claims. The analytically-focused HIMs' skills are crucial for interpreting data

⁵¹ McLoughlin, et al. (2017) observe that nationally-based EHR systems, including Australia's 'My Health Record' (a personally-controlled system), are complex, fraught with risk, and significantly disruptive.

and standards, and rendering the former useable. We know that this expertise is crucial for maximising healthcare facilities' revenues and, conversely, for challenging revenue claims and minimising payments by funding organisations such as governments and health insurance companies. Arguably, and consonant with many HIM-participants' perspectives, Australia's highly contested and complex healthcare financing environment's dependence upon precision and interpretation is trending against the full automation of non-standard classification and DRG-related work in the medium-term. The automation of health classification will require considerable time and money. The complexities point to major developmental ICT challenges, and present an implicit need for interpretive human input and decision-making in complex classification. This combined classification-IT (sub-)domain offers considerable scope for future HIM commitment of expertise and leadership.

We now consider emerging opportunities for Australia's HIMs, informed by the findings of the current study.

Pathway 3: new opportunities

The findings suggest that the Australian HIM experience will mirror Kadlec's (2016) recent prediction for America's HIMs, specifically a shift from managing medical records to 'playing a leading role' (p.37) in analysing and maximising the value of health data to inform the planning, delivery and quality of care, and healthcare cost reduction. In the current study, this was seen in work of many private hospital HIMs, and some of The Royal's HIMs (Chapter 6).

Informing health information policy

The HIMs' deep understanding of health data places them in a potentially strategic position to inform, and engage actively in the development of health information and health-ICT policy. As seen in the case study of the SICC (Chapter 7), this already occurs at state government level in the contexts of health classification policy and practice. Leadership and advocacy for the profession and its interests within national and state policy arenas is important because of the heretofore invisibility of the profession and HIMs' work.

Health information governance

The findings of the current study pre-empt the conclusion that systematic attention to and ownership of health information governance presents a logical and necessary direction for Australian HIMs. This is pertinent to practice standards, and clinical documentation improvement. The umbrella of health information governance includes organisational appropriation of HIM documentation specialists' knowledge and informed advice to guide clinicians and managers with the intent to improve (electronic and paper) medical record documentation. The objective is to support or contain revenue retrieval, improve care outcomes, support classification, and maximise the quality of population and sub-population health data. The findings of the current study point to political challenges surrounding health information privacy which must be owned and managed by future HIMs, amid growing technologisation and health data mobilisation; these also lead us to conclude that cybersecurity will inevitably become a priority.

The phenomena of more and more data, and their analysis

Concurrently, a number of forces are emerging and new spaces opening up, wherein dirty data need not only to be cleansed and (re-)ordered, but to be reconciled and re-produced. Volume is thus becoming the dirt or disorderly mess that requires the HIMs to process, manage, systematise and curate health information excess.

The fact of mobilisation leads us revisit to the recent phenomena of “big data” and data analytics. Recalling Timmermans and Berg's (2003a) prediction that the EHR would constitute the next major change in healthcare after EBM, and adopting Tsoukas' (1997) notion of soteriological optimism⁵², applied in his case to the ‘increasingly pervasive use of information’ (p.840), we are drawn to the conclusion that “big data” and, concomitantly, analytics, arguably constitute the next significant developments in the health information arena. They emerge from the current study as challenges for Australia's HIMs in their future custody and protection of the source of truth, and in maintaining health data integrity and privacy.

⁵² Tsoukas (1997) observes, somewhat sceptically, a widespread and unquestioning perception of the value of increasingly large (and transparent) volumes of data.

Trending towards data analytics

The findings inform a conclusion that future challenges for HIMs will lie in their negotiation, management, and analysis of increasingly more data. Logically, this will necessitate the expansion of their long-standing management of access to health information and their organisation-wide privacy-related responsibilities. This may include what Polonetsky, Tene and Jerom (2014) describe as benefit-risk assessments regarding disclosure of individuals' health information, and what Tene and Polonetsky (2013) allude to as definitions of what is personally identifiable in big health datasets, and disclosure of decisional criteria. The HIMs' deep knowledge of the provenance and idiosyncrasies of health data position them well to monitor "big (health) data" usage and, acting again as the interface, to provide access to stakeholders (and patient-subjects) in user-friendly formats. When considering Australian HIMs' future foci and direction, it is important to be cognisant of scale. "Big data" occupies a big space. Its handling and analysis demand a composite of specialised skills (including mathematics and computer science) beyond the ambit of HIMs' professional competencies. Optimally, HIMs would expand and execute further their analytical skillset and (following The Royal's HIMs) create alliances and simultaneously undertake textualisation work whilst engaging collaboratively with other specialists in this space.

We now address the limitations of the research.

Limitations of the research

In the current study, Australia's HIMs described their work in in-depth interviews, and were observed ethnographically. I placed reliance upon their perspectives as related to me, as researcher. I also made efforts to enrich the data through the inclusion of three case studies, two of which relied upon ethnographic methods.

The potential effects of the sample selection can be extrapolated to the reality that, according to Liamputtong (2009b), researcher and participants bring different perspectives to the research. In applying what Teddlie and Yu (2007) refer to as 'expert' (p.84) judgement in the processes of sample selection for the individual interviews, and in case study identification and membership, I have inevitably infiltrated my own biases. The subjectivity attendant upon the researcher-participant relationship is therefore acknowledged. Efforts were made to mitigate potential adverse

effects of unintentional bias, such as via methodological and data source triangulation and through my acknowledgement of my positionality in the health information management world. Regardless of these measures, I remain mindful of the limitations.

Case Study 1, described in Chapter 6, involved the singular (The) Royal Healthcare Network. Ostensibly, this may or may not be reflective of HIMs' professional work in other Australian health networks, owing to multiple factors. These include different sizes and degrees of specialisation of tertiary teaching hospitals, and variations in the mix of healthcare agencies, and in the types and services delivered in different networks; these may affect the foci of HIMs' work to some extent. Case Study 2 (State-wide ICD Coding Committee [SICC]), described in Chapter 7, provides a snapshot of HIMs' classificatory decision-making and infrastructuring at state level. Similarly, this might or might not be reflective of the expert work undertaken by similar committees in other states and territories, and the influences and pressures on HIM-Coders in slightly different ABF environments. Notwithstanding the combination of methods employed, ethnography's inherent limitations, described by Liamputtong (2009b), may have impacted upon this study. For instance, the case study of the PAS implementation reflects only one setting, *albeit* involving 10 widely-dispersed hospitals and their respective associated healthcare facilities; this experience may or may not be generalisable to PAS implementations in other regions, networks, or institutions.

Furthermore, whilst in-depth interviewing brings strengths to qualitative research, each interview reflected only the individual participant's perceptions and experiences of his or her health information managing. Attempts were made to accommodate for this limitation by the range and places of employment of HIMs approached for interview prior to theoretical saturation, as well as through the use of ethnographic observation in Case Studies 2 and 3.

This brings us to the final conclusions of this study.

Conclusions

A keystone species

The findings reported in the three preceding chapters converge to provide a multi-dimensional view of the HIMs' articulation and infrastructuring work in multiple social worlds across the

healthcare sector. Their adaptability, flexible technologising, and mediatory boundary work often go un-recognised. Operating in an intermediate world, their boundary-spanning is critically important. They willingly 'own' health data and information and see themselves as the guardians of the (constructed) truth. In some environments they are cognisant of being invisible and under-recognised. Their invisibility is a precondition for the truth being accepted as such. As soon as the HIMs, the truth-makers, become visible, the truth may be seen to be constructed. Notwithstanding this, their behind-the-scenes work needs to be kept thusly. This, then, is the conundrum.

Re-contouring the profession

The current research indicates that, to secure their futures, Australia's HIMs need to expand and deepen their roles and form strong alliances with ICT specialists, clinicians, and others. They need, continually, to build upon their existing knowledge and skills to accommodate the changing and complex analytical, 'qualculative', classificatory and information system demands of an increasingly technologised, information-centric healthcare system.

The current research leads to the conclusion that the HIMs' extensive professional knowledge and skillset are under-utilised, especially given their deep understandings of the provenance, integrity and meanings of health data and information. Whilst there is wider, increasing focus throughout the healthcare system on data linkage and analytics, it is the HIMs who know the origins and integrity of the data. Their expertise is, however, recognised in the contexts of hospitals' HIS management and ABF-based funding models. Their specialised clinical documentation expertise could be more fully used by the corporate (managerial) and medical structural interests in light of the massive institutional and wider healthcare system reliance upon comprehensive, good quality data. The establishment of mandatory, confidential reporting by HIMs of potentially serious patient safety issues or outcomes that reveal themselves in the documentation and during their classificatory, auditing, and analytical work, would seem to be an obvious next move by government and synergistic with the HIMs' growing information production role.

Re-visiting the meta-principle

The Australian health information management profession has emerged as an organising device central to healthcare managerial, research, and medical interests. Enacting a reconciliation role, the

HIMs reside on the boundaries of the healthcare system's clinical, managerial and ICT worlds. In order to achieve their goal to produce key boundary objects they constantly traverse boundaries and communicate, debate, interact, negotiate, collaborate and ally with other human and non-human actors. Much of their work is unseen, although the constantly increasing foci on and demands for information and their analyses render them more visible in some workplaces. The paradox lies in the fact that the HIMs produce and are imbued in mobile, static, mutable and immutable data, and information and systems. Their infrastructuring and other work is critical to healthcare institutions including hospitals, and to the healthcare system; however, their mess-reducing, ordering, reconciliation work has to stay invisible for order to be seen as immutable.

Focused on establishing and maintaining the source-of-truth and achieving health data purity, the HIMs espouse and enact technologies to improve efficiencies and enhance the quality of their informational outputs. Their creation of order is becoming more complex as they increasingly manage information production processes. They constantly and pragmatically wrestle with the hindrances wrought by technological limitations. Operating within and across the seemingly disparate medical and managerial-financial arenas, the HIMs are allied health professionals but not clinicians; simultaneously, they are managers of people, developers and implementers of systems, health informaticians, and data classifiers and analysts. Their knowledgebase enables them to communicate effectively in a wide range of within-organisation social worlds and throughout the healthcare sector.

The widening chasm

Together with technologisation, the emerging post-bureaucratic model of technogovernance – reflecting intensification of the volume and complexity of regulatory policy, legislation, and standards - presents a crucial consideration for the future of Australia's HIMs. This involves ongoing changes including an emphasis on creating high-value data. This now extends to arbitration among different information perspectives. Consonant with Douglas's (1966) theorising that the profane and the sacred need to be kept separate to prevent further pollution, the HIMs maintain clear boundaries around these in their efforts to produce coherent 'scientific' facts. Whilst increasing technological capacity enhances their production and dissemination of health data and

information, it simultaneously creates new and more complex problems in the realms of privacy protection, data custody, consent to access electronic data, and verification of the source of truth.

The overarching problematic of the contemporary Australian health information management profession is four-fold. First, paradoxically and notwithstanding the centrality of their scientific work, the HIMs' ordering is largely invisible. Second, their reach is ever-widening as technology proves a temperamental ally that demands constant updating and improving. Third, the chasm between their dichotomous worlds of the profane and the idealised sacred is ever-expanding amid intensifying environmental risk, and systemic dependence upon their work. Finally, the centre of gravity of the HIMs' work has shifted to reveal a "new", boundary-spanning HIM whose infrastructuring work enables coherent information production processes amid the intensifying challenges of the healthcare system.

This original and important research has demonstrated that in their struggle to achieve data and information reconciliation, the 21st century Australian HIMs are enmeshed in an increasingly risky, faster, and more intensely technologised world; this bears little resemblance to the comparatively sedate environments occupied by their antecedents in an ante-computer networked world. Metaphorically, the 21st century HIMs now retain one foot in the world of the disorder, mess and profanity of raw health data, and the other in the worlds and systems of classified, purified, sanitised data and purposely (re-)constructed information that comprise the official versions of the patient and his or her treatments and outcomes. The challenge for these "new" HIMs is that this gap is constantly morphing into a different and larger shape. Significantly, some of their traditional responsibilities are being superseded by new ones in a world that struggles with more highly volumised and mobilised health data, and increasing expectations of the healthcare system. The HIMs' challenge is to maintain equilibrium and balance in a world wherein standards forever change and multiply, technologies are constantly re-invented, the profession needs to engage in ongoing up-skilling, and the historically influential medical and managerial interests continue to demand competing allegiances. This study suggests that it is the time for HIMs to embrace the risk society's opportunities to 'have a voice' (Beck 1994, p.23), self-advocate, and re-position themselves firmly and centrally in a 21st century "new" version of Foucault's world of 'disciplinary writing'.

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Health Records and Information Privacy Act 2002 (NSW)

Health Records (Privacy and Access) Act 1997 (WA)

Health Records (Privacy and Access) Act 1997 (ACT)

Information Act (NT)

Information Privacy Act 2009 (Queensland)

Personal Information Protection Act 2004 (Tas)

Privacy Act 1988 (Commonwealth)

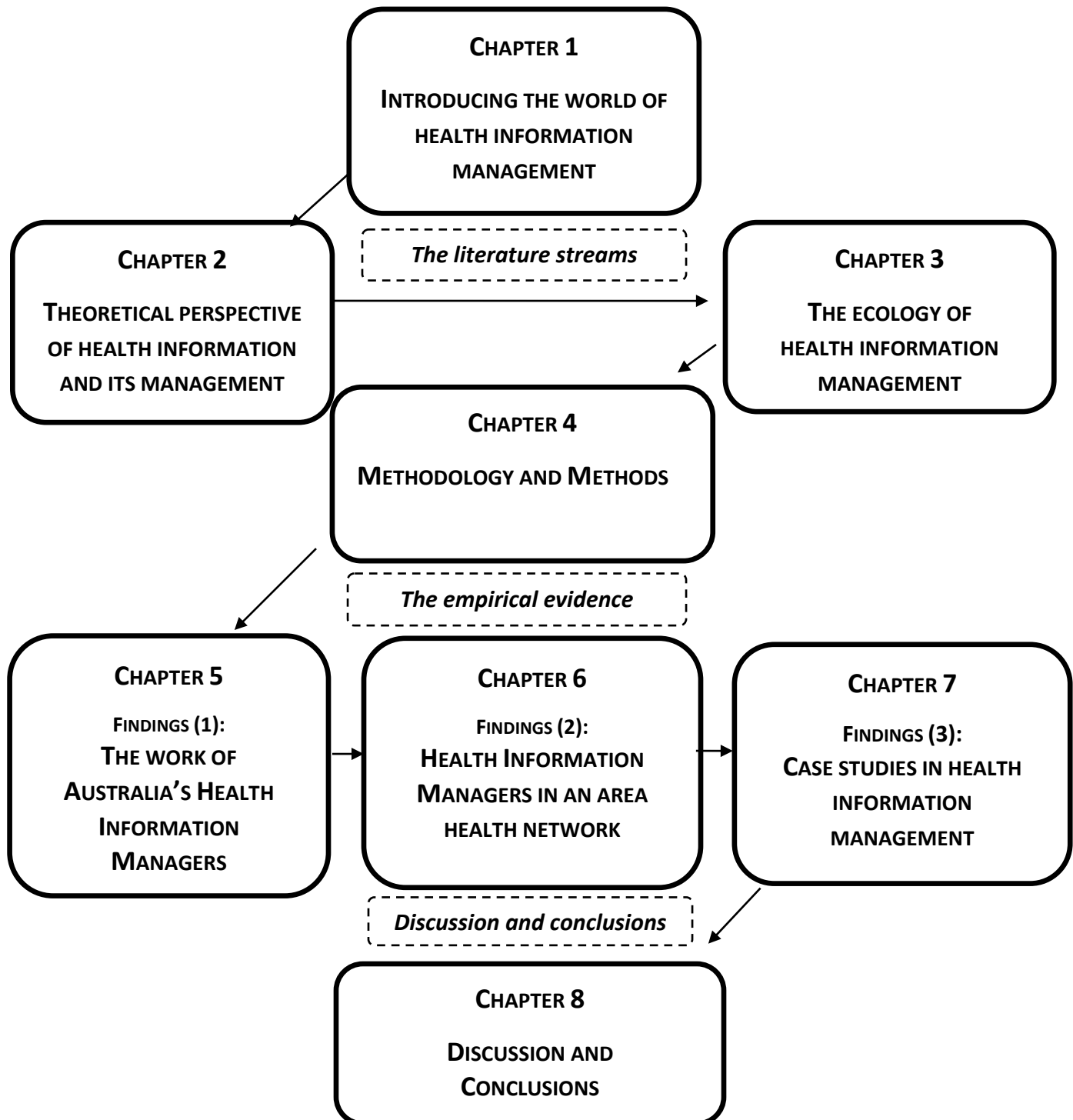
Privacy Amendment (Enhancing Privacy Protection) Protection Act 2012 (Commonwealth) and Australian Privacy Principles

Right to Information Act 2009 (Qld)

Right to Information Act 2009 (Tas).

Appendices

Appendix 1. Flow of the dissertation



[Appendix 2. Examples of standards](#)

Medical record management standards: Source-oriented medical recording (SOMR) is the most commonly used recording methodology and order of arrangement within the paper UR (Teslow 2012; McWay 2014). Weed's (1970) problem-oriented medical recording methodology is used to a lesser extent. Many other methodologies and standards for electronic- and paper-based health information systems and technologies, implemented and overseen by HIMs, exemplify Berg and Timmermans' (2000) concept of 'universal' (p.31) orders, e.g: national standards for digitised and paper records and forms; health data standards and standard minimum datasets; specialised medical record numbering systems; medical record filing and tracking systems; disease and operation nomenclatures; and multiple classification systems and standards. Arguably, health information infrastructures, such as EHRs and hospital PASs, enable economies of scale through technologically mediated and standardised best practices (e.g. Wagner and Newell 2004; Monteiro et al 2013).

Data standards and representations: The HIMs also engage with multiple national and international data standards and representations for health data generally and semantic, technical and functional standards for electronic data interchange; e.g. the National Health Data Dictionary (Australian Institute of Health and Welfare 2015); standards for data messaging and content, metadata, interoperability, and codes; and standardised terminologies that represent and communicate clinical concepts. Useful observations are found in Australian Institute of Health and Welfare (2015), Braunstein (2015), Cimino (1998, 2000, 2006), Conrick et al (2006), K. Latour (2002), McWay (2014), Steele (2012), Taylor (2006), Whetton (2005), and the World Health Organization Collaborating Centre for Patient Safety Solutions (2007).

Patient identification: Other standards, harmonised internationally, apply to the identification of patients and providers (e.g. Holmes 2012; Standards Australia 2012a, 2012b, 2014; Australian Commission on Safety and Quality in Health Care 2008).

Other nationally-based standards discipline HIMs' work, include those supporting and framing: health facility accreditation; the safety and quality of healthcare; clinical indicators; and management and organisation-wide performance and benchmarking (e.g. Australian Commission on Safety and Quality in Health Care 2012, 2015; Way 2012; Australian Council on Healthcare Standards 2014).

Appendix 3. Consent form and information letter for potential study participants

Attachment One: Consent form for informants (for reverse side of Information Letter)



I _____ agree to participate in the research project *The making of health information management in Australia: implications for education and professional development* (UTS HREC approval number: 2007-177R) being conducted by Kerin Robinson (Kerin.M.Robinson@student.uts.edu.au; 03-9479-5722) of the University of Technology Sydney for her PhD degree.

I understand that the purpose of this study is to explore the policies and other factors that influence the collection, management and uses of health information and, especially, the role of health information managers in Australia.

I understand that my participation in this research will involve **one or more of the following activities** (tick whichever apply to you):

- ☐ A semi-structured interview about health information management work. This will last up to approximately 60 minutes (Health Information Managers; non-clinicians).
- ☐ A semi-structured interview about my understanding of the role of health information in my clinical discipline. This will last up to approximately 30 minutes (clinicians).
- ☐ A semi-structured, focus group interview about health information management work, lasting up to approximately 90 minutes.
- ☐ A case study involving discussion and researcher-observation of health information management work in re-structuring health information as it moves through organisations and/or the health care system. This will last approximately two hours per session, for two to four sessions.

I understand that my comments will be recorded by the researcher, either in the form of notes (case studies) or through the use of audio recording (interviews and focus groups).

I am aware that I can contact Kerin Robinson (Kerin.M.Robinson@student.uts.edu.au tel: [03] 9479-5722) or either of her UTS supervisors, Professor Rick Iedema (Rick.Iedema@uts.edu.au tel: [0]2 9514-2709) or Dr Theresa Anderson (Theresa.Anderson@uts.edu.au tel: [0]2-9514-2720), if I have any concerns about the research. I also understand that I am free to withdraw my participation from this research project at any time I wish, without consequences, and without giving a reason.

I agree that Kerin Robinson has answered all my questions fully and clearly. I agree that the research data gathered from this project may be published in a form that does not identify me in any way.

Signature (participant)

____/____/____

Signature (researcher or delegate)

____/____/____

NOTE:

This study has been approved by the University of Technology Sydney, Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research which you cannot resolve with the researcher, you may contact the Ethics Committee through the Research Ethics Officer (ph: 02 9514 9615, Research.Ethics@uts.edu.au) and quote the UTS HREC reference number. Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

Attachment Two: Information Letter (for reverse side of Consent Form)*INFORMATION LETTER*

The making of health information management in Australia: implications for education and professional development (UTS APPROVAL NUMBER: 2007-177R)

WHO IS DOING THE RESEARCH?

My name is Kerin Robinson and I am a PhD student at the University of Technology Sydney (UTS). My supervisors at UTS are Professor Rick Iedema and Dr Theresa Anderson.

WHAT IS THIS RESEARCH ABOUT?

This research is being done to find out about the policies and other influences on the collection, management and uses of health information and, in particular, the role of health information managers in Australia. This includes the influences of emerging technologies and key health information-related factors affecting clinical practice and communication.

IF I SAY YES, WHAT WILL IT INVOLVE?

I will ask you to: (i) be interviewed by me (singly or in pairs); or (ii) take part in a focus group; or (iii) take part in a case study discussion and let me watch you as you undertake some aspects of your work. The focus of our discussion will be your understanding of health information and related work functions and/or policies. This may include: aspects of its creation, management, applications, and significance to you and your work; how you manage or use it; and how you perceive the directions of health information management.

ARE THERE ANY RISKS?

There are few if any risks because the research has been carefully designed and the focus is on the policies and practices of health information management and the professional practices applied in managing, coding, reporting, analysing or using it.

You and your workplace will be anonymised in my thesis and resulting publications. For case studies, if your workplace is potentially identifiable because of the specialised work involved, your permission will be sought prior to publication.

WHY HAVE I BEEN ASKED?

You have been invited to be a participant because you are able to give me the information I need to find out about: (i) your work in creating and/or using health information; or (ii) the management or design of health information or systems; or (iii) health information policy development or implementation.

DO I HAVE TO SAY YES?

You don't have to say yes.

WHAT WILL HAPPEN IF I SAY NO?

Nothing. I will thank you for your time so far and won't contact you about this research again.

IF I SAY YES, CAN I CHANGE MY MIND LATER?

You can change your mind at any time and you don't have to say why. I will thank you for your time so far and won't contact you about this research again.

WHAT IF I HAVE CONCERNS OR A COMPLAINT?

If you have concerns about the research that you think I or either of my supervisors can help you with, please feel free to contact us: Kerin Robinson: tel 03-9479-5722; Kerin.M.Robinson@student.uts.edu.au; or Professor Rick Iedema: tel (0)2 9514 2709; Rick.Iedema@uts.edu.au; or Dr Theresa Anderson: tel: (0)2-9514-2720; Theresa.Anderson@uts.edu.au

If you would like to talk to someone who is not connected with the research, you may contact the Research Ethics Officer on 02 9514 9615, and quote this number 2007-177R.

Appendix 4. Interview schedule (as approved by Ethics Committee)

The interview themes and outline of schedule

A. The interview questions for health information managers will derive from the following themes:

THEMES TO BE EXPLORED (SHADED) AND QUESTIONS TO BE POSED
<p>1. <i>Introductory items and background</i> of informant.</p> <p>Introduction; position title; length of experience as a Health Information Manager; area or sub-discipline of professional expertise.</p>
<p>Introduce myself and my research.</p> <p>Do you have any further questions about the research at this stage?</p> <p>Firstly, can you tell me your position title, please.</p> <p>How long have you held this position?</p> <p>When did you graduate in health information management? For how many years have you worked in the field?</p> <p>If we consider health information management in its broadest context, in which area or sub-discipline have you worked for the most time?</p> <p>In which area or sub-discipline are you working now?</p>
<p>2. <i>Meanings and representations.</i></p> <p>Interpretations of medical/health records, record-keeping, and health information.</p>
<p>Let's talk about 'medical records' and 'health information'...</p> <p>In your opinion, why do we keep health information and medical records?</p> <p>What do you see as the functions of health information?</p> <p>What are your understandings of the various forms and media of health information? Do you see any as being more important than others?</p> <p>In your view, 'in a nutshell', what does health information represent?</p>
<p>3. <i>The body of knowledge</i> surrounding health information management</p>
<p>What do you see as the domains or main sub-disciplines of health information management?</p> <p>What are the key areas of knowledge required to be an effective health information manager?</p>
<p>4. <i>Health information – the context.</i></p> <p>The perceived big picture view of the "role" or "function" of health information: in clinical medicine; in health care generally; and at population level.</p>
<p>Can you describe your 'big picture' view of health information as it evolves from the point of care through to its</p>

role in the wider society?

5. *The stakeholders.*

The “real” stakeholders in health information, medical records, and their end-products. The stakeholders in health information policy

In your view, who are the key stakeholders in health information?

... You may wish to consider this in two parts: firstly, the key *stakeholders* in medical records and health information at the facility or service level; and secondly, stakeholders at state, national, and even international levels.

In relation to health information policies at the bigger picture, state and/or national, levels:

Who do you see as the key *stakeholders*?

Who do you see as the key *decision-makers*?

In your view, who are the *beneficiaries* – at all levels – of health information management work?

6. *The work of health information managers.*

What the work of health information management involves; its perceived value, or importance or unimportance: to whom, and why.

Can you tell me your perceptions of the importance, or unimportance, of the work of health information managers?

To whom is HIM work of value (or not)? For what reasons?

7. *The transforming role of the health information manager.*

The HIM role in relation to the previously identified functions of health information: in the management of health information systems, and in the management and transformation of health information from medical record entry through to the final ‘end-products’.

Let’s talk about the role of the health information manager in producing, changing and transitioning health information ...

How do you see the role of the health information manager in relation to the functions and aspects you have identified? For instance, what is their role in the management and transformation of health information through to the various ‘end-products’?

8. *The leading discourses in health information management.*

In your view, what are the key issues today in health information management?

- within your facility or service environment;
- in the wider state, national or international health care industry or environment?

<p>What do you see as the key issues of the future?</p> <ul style="list-style-type: none"> ▪ within your facility or service environment; ▪ in the wider state, national or international health care industry or environment?
<p><i>9. Change, knowledge management, standardisation, and the technologising of health information.</i></p> <p>Major changes affecting health information and health information management work now and in the future. Influences of, and dealing with, standards and standardisation, and new information communication technologies. Threats; challenges.</p>
<p>What do you see as the major changes affecting health information and health information management work?</p> <p>What changes do you see impacting upon future health information management?</p> <p>Can you tell me what changes you see posed by new information communication technologies?</p> <p>Do you see these changes as challenges, opportunities, or threats? Would you care to elaborate?</p> <p>How important are standards and standardisation in health information management, for example to filing, IT, DRG, classification, and other systems, and their management?</p>
<p><i>10. The notion of power and health information.</i></p>
<p>How do you perceive of health information in the context of 'power'?</p> <p>How do you perceive of health information management in the context of 'power'?</p>
<p><i>11. Professional role.</i></p> <p>Role identification and delineation; emerging or de-merging directions.</p>
<p>Would you like to comment on the professional role of health information managers; for example, how is that role identified and delineated? What do you see as the emerging or de-merging directions of HIM professionals?</p>
<p><i>12. Professional knowledge and education.</i></p> <p>Gaps in knowledge or education in the context of responses to the above questions.</p>
<p>How do you maintain currency in your own professional knowledge and skills?</p>
<p><i>Ending</i></p>
<p>Do you wish to make any other comments about health information or its management?</p>

¹ It is possible that some respondents will have taken time out of the profession since graduating; for example, because this is a female-dominated profession some may have taken time out for family reasons.

Appendix 5. Summary of axial and focused coding

Axial codes	Focused codes
	*Cells with >1 focused code have been further refined
Access to medical records; Control of access; Effects (on access) of technologisation; Challenges surrounding increasing demands for access	Articulation work
Accountability: increasing.	Accountability
Accreditation; KPIs; Benchmarking: internal, (inter-) national	Technogovernance
Activity-based Funding (ABF) model(s); Casemix technologies; Changes in role, shifts in power and influence in casemix environment; DRGs; ABF expertise of HIMs	Classification Calculation
Advice: professional (including on all types of health records)	Intermediation
Amalgamation of health information systems and/or medical records	Intermediation
Analysis of health data; Input to senior management, Board; Statutory reporting; Organisational dependence on data analysis; Effects of reporting and analysis of coded data on medical record documentation	Analysis Calculation Accountability
Articulation Work; Contract negotiation	Articulation work
Audits and auditing; Coding, data and documentation auditing; Safety and quality audits; Managing and reporting on audits; External, internal, and multi-disciplinary audits; Conflicts of interest for coding auditors; Auditing for health data governance	Financial Imperative Classification Ordering
Auto-Coding; SNOMED-CT; Context of digital/scanned medical records; Contexts of Electronic Health Record (EHR), classification	Technologisation Standardisation
Boundary Crossing; Boundary Work; Dealing with others including other disciplines	Boundary work
Bureaucratic framework; Bureaucratic imperative; Changing bureaucratic environment; Business rules; Reliance on legislation; Reliance of organisation on HIMs' bureaucratic work	Bureaucratic Work Technogovernance Power
Building, developing systems, programs; Building Health Information Services (HIS)	Articulation work
Business advice on coded data and utilisation trends	Classification Analysis
Career development; Career progression	Professional role
Challenges – professional; Challenges in transition to EHR	Transitioning Technologising
Change; Change of professional role; Positioning for change; Educating clinicians and staff for change; Managing change in socio-technical environment; Managing culturally-based responses to state-imposed organisational change	Transitioning Professional Role Textualisation
Clinicians; Dealing and working with clinicians	Intermediation Work

Coded data; Coded data-applications; Uses of coded data including in mental health	Analysis
Classification; ICD-10-AM; DSM; Casemix; Specialist knowledge, expertise; Telling the patient's story; Classificatory workarounds for research; Classifying population health; Managing the classification's technology and limitations; Pressures, rigidities of national, state requirements; Conflicting issues: classificatory practice	Classification Research Technogovernance
Committees and fora, internal and external to HIMs' workplaces	Bureaucratic Work
Communications with system users, clinicians, others	Intermediation work
Confidentiality; Imperative of managing privacy and confidentiality	Privacy
Conflicts of interest	Tensions
Co-ordinating, linking role	Articulation work
Custodial role	Bureaucratic Work
'Customer'/stakeholder in HIMs' work; End-users (internal, external, local, national)	Articulation work
Data collection and reporting (and systems), organisation-wide; Inconsistencies	Ordering
Data integrity, quality, reliability; Data quality activities undertaken by HIMs	Ordering
Data and information: understanding them; Knowing the business rules	Ordering
Dealing with other disciplines including finance, IT, medical, nursing, allied health	Boundary work
Definition, 'Health Information Manager'; Commonalities	Professional role
Demand (increasing) for justification of actions in healthcare; Decision-making	Accountability
Digital (scanned) medical records; Changes, including work practices; Effects on the HIS workplace; Developing the business case; Costs, resources; Staff re-training; Benefits to organisation; Effects on patients (safety, privacy); Medico-legal challenges, constraints; Leading discourse in profession	Technologisation
Discharge Summary; Confidentiality; Effects of delays; Electronic summaries; Sociotechnical change to clinicians' work; Sub-optimal systems: effects	Technologisation
Documentation; Incidents and policies driving documentation; Clinicians' role and education in 'documentation'; Challenges of inadequate clinical documentation	Ordering
Domains of professional knowledge: health information management and 'traditional' role, systems, staff management; classification, ABF, analysis; Systems management, ICTs, informatics; Transferability of professional knowledge and skills; Performance and other data management, reporting, analysis, research, queries	Domains of knowledge Professional role
Education; Student HIMs; Being workforce-ready for HIM role; Role-knowledge of HIM; Education and training of staff and clinicians	Professional Role Boundary Work
Electronic Health Records and system integration; Enablers, barriers to adoption, implementation, ownership, and governance; HIMs' increasing EHR role; Formalising processes; Managing digital and hybrid interim options; Managing interface issues; Cost factors; Impact on classification; Security and privacy;	Technologisation Leading discourse

Managing clinician resistance; Strategic challenges	
Efficiency; Work ethic; Desire to be practical, productive; Foci: reliable systems and 'big' picture, government policy and funding issues; Relevance to organisation	Accountability
Ethics and values; HIMs' understanding of the value of their work for patient care and evidence of care provided, revenue justification, community benefits, population health surveillance, and research; Patient record/data (custodial)	Accountability
Expertise of HIMs	Domains of knowledge
Financial-economic imperative; ABF and related pressures for reimbursement and survival of hospital; Responsibility for providing hospital revenues	Financial imperative Accountability
Format and media of Medical Record; Critical decisions regarding format and media	Articulation Work
Forms; Form Design; Screen Design; Legislation; Standards; Multiplicity of forms	Ordering
Future directions in HIM Roles; Challenges (IT 'savvy', maintaining currency, being ABF focused); Retaining core HIM knowledge-base and skills; Threats to profession including poor marketing, complacency, IT enthusiasts; Planning for change, increased electronic future; Increasing information needs, technical upskilling; Knowledge gaps; The 'good old days'	Domains of knowledge Technologising Professional role
Governance of information: HIM functions in information governance and management of legal and regulatory imperatives	Governance Technogovernance
Government requirements, rules (increasing): health insurance; casemix; data collection and reporting	Bureaucratic Work Technogovernance
Health information in ICTs and systems; Imposed systems; Critique of systems; System failures; Lack of governance	Articulation Work Technologising
Health information science: technical challenges, issues; Decision-making re: state-based IT strategy, facilities' storage capacity, complexities in system amalgamation	Domains of knowledge Articulation work
Health Information Services: components; services; HIMs' responsibilities	Domains of knowledge
Health systems: users; User-education; Managing user input	Articulation work
Identity: professional; Speaking the same 'language'; Attending to detail; Dealing with others' perceptions; Understanding the processes; Doing informatics; Understanding the data; ; Approach to managing the data	Professional role Intermediation work
Identity: patient and client; Importance of systems to ensure accurate identity	Ordering
Implementing and managing health information systems, including PMI, tracking; Argument for HIMs to control all systems where core patient data are collected	Technologisation
Invisible, hidden, unseen, unacknowledged, 'taken for granted' work; Contrast: highly valued work	Intermediation work
Information & Communications Technology (ICT): role in HIMs' work; HIMs' perception of IT as a technical tool to support information and business needs;	Articulation Work Technologisation

Working relationships with IT, committees; Increasing HIM involvement; HIMs' cultural differences from and frictions with IT (timeframes, data quality)	
Keeping things on track; Monitoring; Overseeing staff, systems, data	Intermediation work
Knowledge; Key areas of HIMs' knowledge and critical skills; HIMs as 'irreplaceable'	Domains of knowledge
Linkage of health data, databases, and medical records; Perceived privacy, legal and other tensions between greater access to data and risks of inappropriate use	Professional Role Privacy
Management of staff and systems	Articulation work
Meaning and/or significance of HIMs' Work; Survival of hospital; Giving clinicians and others information needed to do their jobs; Giving Executive, government and other authorities the information needed for organisational, supra-organisational and societal decision-making; Reporting data to government, for organisational revenues; Health information governance role	Ordering Articulation work Calculation
Medical or health record: ownership; Centrality of the record to health care	Domains of knowledge
Organisationally-related barriers, hindrances	Intermediation work
Policy: HIMs' input to health information policy e.g. on coding, casemix, digitisation (organisational, state-wide); Health insurance data collections	Boundary work
Power: HIMs' perceptions of holding power regarding their data analysis, reporting, classification, and custodial work	Power
Pressure to improve; Pressure of workload; Pressure from management to provide faster, better data and information, more economically	Risk society
Privacy: Privacy protection responsibility; Policy and advisory levels	Privacy
Professional Image; Self-image and -promotion of profession; Confidence in own professional knowledge, abilities	Intermediation work
Problem-solver: HIM as 'go to' person, who fixes IT problems, assists clinicians	Intermediation work
Professional development: mechanisms; Keeping up-to-date	Accountability
Professional responsibilities: Advice to all areas, services; Routine processes, documentation, auditing; Working in electronic and project spaces; Technical aspects of HIS implementation; Increasing technical work	Articulation work Boundary work Technologisation
Professional Role: need for increased flexibility; Changing, multiple roles in different parts of healthcare system; Perceptions of the profession; Low workforce supply, high demand; Concerns: 'generification' of the qualification and loss of specialist knowledge post- course closure; 'Invisible' in organisation; Interface; Driving agenda for enterprise-wide health information; Translational, transitioning, mediating, custodial roles; Skill-level of the work; Increasing data management and advisory, reporting, analysis, governance, co-ordination of user focus, testing, implementation, facilitating, overseeing, data accountability	Invisible Work Evolving HIM role Professional Domains Articulation work

Promotion or self-promotion of profession or status; Low profile; Lack of promotion of profession seen as detrimental to community because of HIMs' expertise	Professional Domains Evolving HIM role
Recording methodologies: usefulness for coding, and as documentation.	Professional Domains
Research: formal, informal; Classifying for research; Perceptions of dominance of ABF, casemix, funding affecting HIMs' research role; Informal: planning, clinical, operational, research uses	Research
Resources for HIMs; Competition for and use of resources; Support via resources	Financial imperative
Risks of (new) systems: assessment and advice on system and patient safety risks	Risk society
Safety; Increased use of data for patient safety and quality of care	Accountability
Sectoral and inter-sectoral differences: classification, documentation	Technogovernance
Socio-technical change or effects, including on clinicians' work	Intermediation work
Stakeholders in health information and medical records	Articulation Work
Standards, standardisation: of data collected and reported; Standards and HIMs' practice; Links: standards, quality/clinical and information governance, patient safety; Standards: classification; finance, technologies, privacy, comparative databases, mental health; Simplification; Extending data accessibility	Standardisation Ordering Technogovernance
Systems: HIMs' expertise, implementation, management, planning for system redundancy; State-wide committees; Responsibilities for business aspects	Professional Domains Technologisation
Teamwork: coding, casemix, data management units	Articulation work
Technologisation; Technologising: see as essential, inevitable, requiring change; Multiple applications of technologies in health information; Dealing with clinicians' access, compliance; Currency with changing technologies	Technologisation
Technology failure: socio-technical issues; lack of standardisation, resourcing	Technologisation
(Dynamic) Tensions/Disjunctions: Centrality of HIS, in tension with others' perceptions of invisibility and of being undervalued	(In)visibility Articulation Work
Transitioning, e.g. to Electronic Health Record	Technologisation
<i>Transforming/translational (mediation) role: Reinventing the patient narrative; Complexity creating change; Challenges of coding: management and technical</i>	Articulation Work
<i>The 'truth'; Determining and ensuring 'source of truth' through reliable systems and data with integrity; Truth and statutory reporting</i>	Ordering work Technogovernance
<i>Value of HIMs' work; Extent to which HIMs' work and advice are valued, respected</i>	Intermediation Work
<i>'Voice'; Visibility; Reporting lines and position in organisation structure</i>	Intermediation work
Ways of working: new ways of communicating, informing; Expanding role	Textualisation Work
<i>Workarounds; Data extraction; Compensating for under-performing ICT systems</i>	Intermediation work

Appendix 6. Boundary objects produced by HIMs at The Royal Healthcare Network

HIM name, participant number, and position title (in order of mention)	Core boundary objects produced from translation work
Tess (031): HIM Operations-Acute Care	<ul style="list-style-type: none"> ○ Acute Care-related Statutory Extracts; external and internal reports (oversight). ○ Casemix-financial reports to Executive and Finance Department. ○ Hospital-wide Key Performance Indicator (KPI) reports. ○ Health Roundtable hospital-wide benchmarking reports.
Sal (034): HIM-IT Applications & PAS Support	<ul style="list-style-type: none"> ○ Patient Administration System (PAS) and upgrades. ○ Scanned Medical Record system; technical upgrades. ○ Medical record forms (formerly).
Jo (033): Director-HIS	<ul style="list-style-type: none"> ○ Strategic leadership and oversight of production: all boundary objects. ○ Casemix, financial, clinical and statistical reports to Board of Directors and Executive.
Jen (040): HIM-Data Manager <i>and</i> (joint) Acting Coding Manager	<ul style="list-style-type: none"> ○ Disease and Operative Procedure Indices (Dataset); other classification outputs. ○ Diagnosis-Related Groups (DRGs). ○ <i>Ad hoc</i> internal clinical and statistical reports. ○ Clinical Unit: Classification, DRG, documentation audits.
Lou (068): HIM Operations-Ambulatory & Community Services	<ul style="list-style-type: none"> ○ Statutory Extracts and internal reports: Non-Admitted Patient Data System. ○ Statutory Extracts and internal reports: (state-wide) Health Facility Reporting System (HFRS). ○ Reports to governments on multiple programs, e.g. Home and Community Care Program, Hospital Admission Risk Program. ○ Processes: Referrals, Outpatient Clinic Waiting Lists.
Cate (065): Mental Health Information Manager	<ul style="list-style-type: none"> ○ Mental Health Services data and reports. ○ Disease and Operative Procedure Indices (Dataset); other classification outputs. ○ Clinical Unit: Classification, DRG, documentation audits.
Pam (029): Manager-Accreditation, Quality & Data KPIs	<ul style="list-style-type: none"> ○ Clinical and Corporate Services: Accreditation ○ Data and KPI reporting: Clinical Governance Framework. ○ Reports to Board of Directors on quality and safety.
Elle (030): Coordinator-Quality, Safety and Risk (Medical and ICU Division)	<ul style="list-style-type: none"> ○ Mortality and other clinical governance reports. ○ Medical record form: Observation Chart.
Jake (037): HIM-Forms Co-ordinator	<ul style="list-style-type: none"> ○ Medical record forms. ○ Disease and Operative Procedure Indices (Dataset); other classification outputs. ○ DRGs.
Jess (036): HIM-Scanned Medical Record (SMR)	<ul style="list-style-type: none"> ○ Scanned Medical Record (SMR). ○ Disease and Operative Procedure Indices (Dataset); other classification outputs. ○ DRGs. ○ Clinical Unit: Classification, DRG, documentation audits.

Kat (035): Freedom of Information & Privacy Officer (network-wide) <u>and</u> HIM-Operations (Staff)	<ul style="list-style-type: none"> ○ Scanned Medical Record. ○ Enabling medical record access for patients and others. ○ Privacy reports.
Sue (066): Health Information Manager	<ul style="list-style-type: none"> ○ Statutory Extract; internal reports: State-wide Inpatient Morbidity Database (SIMD). ○ Hospital-in-the-Home Program reports. ○ PAS. ○ Disease and Operative Procedure Indices (Dataset); other classification outputs. ○ DRGs. ○ Clinical Unit: Classification, DRG, documentation audits.
Tim (038): Health Information Manager	<ul style="list-style-type: none"> ○ Statutory Extract; internal reports: SIMD. ○ PAS. ○ Disease and Operative Procedure Indices (Dataset); other classification outputs. ○ DRGs.
Gai (032): Health Information Manager	<ul style="list-style-type: none"> ○ Statutory Extract; internal reports: state-wide Elective Surgery Reporting System (ESRS). ○ <i>Ad hoc</i> internal clinical and statistical reports. ○ Disease and Operative Procedure Indices (Dataset); other classification outputs. ○ DRGs. ○ Surgical Unit: Classification, DRG, documentation audits.
Di (074): Coding Educator	<ul style="list-style-type: none"> ○ Disease and Operative Procedure Indices (Dataset); other classification outputs. ○ DRGs. ○ Clinical Unit: Classification, DRG, documentation audits.
Ros (067): Coding Auditor <u>and</u> (joint) Acting Coding Manager	<ul style="list-style-type: none"> ○ Coding Audits; Audit Reports. ○ Clinical Unit: Classification, DRG, documentation Audits. ○ Disease & Operative Procedure Indices (Dataset); other classification outputs. ○ DRGs. ○ Casemix-financial reports. ○ Australian Coding Benchmark Audit, and reports.
Deb (039): HIM Operations-Continuing Care	<ul style="list-style-type: none"> ○ Statutory Extract; internal reports; Casemix Sub-acute and Non-acute System (CSNS); Clinical Sub-acute Program. ○ <i>Ad hoc</i> internal clinical, statistical and financial reports. ○ Audits: Sub-acute and Non-acute Program processes and documentation.
Ange (073): HIM-Continuing Care Service <u>and</u> Colorectal Service Administrator & Research Co-ordinator	<ul style="list-style-type: none"> ○ Utilisation and Service Provision Reports: Sub-Acute; and Continuing Care. ○ Disease and Operative Procedure Indices (Dataset); other classification outputs. ○ DRGs. ○ Colorectal Clinical Database; Reports: Surgical; National.